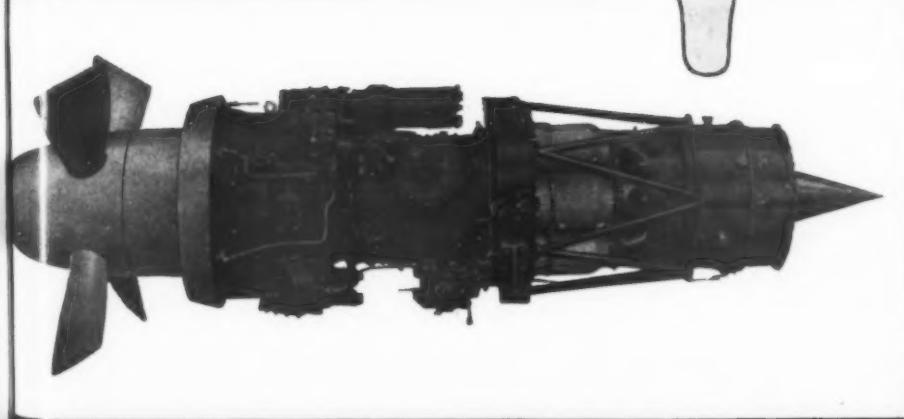


American Aviation

MANAGEMENT
ENGINEERING
PRODUCTION
OPERATIONS
MAINTENANCE
EQUIPMENT



DEC. 20

1954

Exclusive Interview--
Herbert Sammons:
Elands for the U.S. 32



Lockheed Leads U. S.
Turboprop Race ... 21



Reorganization
For MATS? 23



Answers to the
Heat Problems 43



NWA Alaska Route
Assured 54

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AIRTRENDS

Washington, D. C., Dec. 20, 1954

ABOUT-FACE OF DEFENSE DEPARTMENT in new order directing the AF, Army, and Navy to spread defense dollars more widely will have a major effect on aircraft industry. Order specifically cautions against concentration of orders with major suppliers, even if they are low bidders.

New criteria: Maintenance of multiple sources of supply, geographical dispersal, avoidance of concentration of contracts among a few companies, multiple awards, preservation of skilled labor forces, utilization of existing open-industry capacity, preservation of essential management organization and know-how, and maximum subcontracting.

AIRCRAFT INDUSTRY'S ORDER BACKLOG, as of Sept. 30, was \$14.9 billion with 94% of the aircraft backlog, 97% of engine backlog, and 86% of propeller backlog for the military services.

Effect of new maximum subcontracting policy on these existing orders is questionable although it should mean more subcontracting. Assistant Air Force Secretary Roger Lewis will meet with his 16-man Advisory Committee on Small Business on Jan. 28, at which time the overall effect of the directive should gain some definition.

MAXIMUM EFFECT OF POLICY should be felt on new contracts and it may well decide successful bidder on at least one major USAF competition now underway. On basis of fiscal 1955 spending through Oct. 31 by USAF and Navy, this would affect about \$3.2 billion of fiscal 1955 contracting. Actually USAF and Navy had \$8.9 billion in unobligated funds as of Oct. 31. Air Force share represented about \$6.5 billion and the Navy share \$2.3 billion.

TURBINE TRANSPORT RACE, military and civil, is at its all-time peak of activity and competitive pressure. Domestically there is a big push on between individual companies to get the first turbine transport, turbojet or turboprop, into airline service. Internationally the struggle is between England and the U. S. American manufacturers are hopeful they can get jets and turboprops into the hands of world airline operators before de Havilland can make up the ground lost by the Comet disasters.

Major factor in this country's jet transport schedule is outcome of the USAF jet tanker competition, due to be decided any day now.

BOEING IS OFFERING THE 707 jet transport to the airlines for delivery in early 1958 if orders are placed early in 1955. An order for 25 would be completed in 17 months, for 20 in 14 months, and for 15 in 11 months, Boeing president William Allen told the airlines. Boeing's current price estimate: \$4.25 million based on orders for 50 aircraft.

LOCKHEED IS INDICATING DELIVERY of its turboprop-powered 1449 in early 1957. Unofficial cost estimate: \$2.5/\$3 million. Promise: "over 75 mph faster block speed than piston engine transports, 30 mph faster

AIRTRENDS

(Continued)

than any projected propeller-driven, long-range, commercial transports." Powered by four Pratt & Whitney T-34's, the 1449 grosses 175,000 pounds.

CONVAIR IS PUSHING PLANS for a four-engine version of the Convair 340 but outlook is clouded by engine availability. Problem faced by Convair is acknowledged preference of American Airlines, the largest single airline customer and one now seeking such a plane, for four-engines.

Rolls-Royce will not sell the 1500-1800-hp Dart turboprop to any manufacturer for applications competitive with the Vickers Viscount until 1958. Press reports from London had previously stated that Convair had ordered eight Darts. It is still not apparent if the ban on such sales applies to engines for a prototype plane.

ANSWER TO CONVAIR'S ENGINE PROBLEM can go either of two ways:

Westinghouse Electric Corp., which holds U. S. license rights on the Dart engine, is reportedly meeting with Rolls-Royce late this month to decide on possible U. S. production of the small turboprop. This would also enhance possibility that Fairchild will go ahead with production of the Fokker F-27 feeder line plane which uses the Dart engine. (*Fokker is going ahead with production before flight of the prototype plane and reportedly has a firm order from Trans-Australia Airlines.*)

Other alternative for Convair is a twin-engine turboprop version of the 340 powered by Allison 3750-hp 501-D10 engine, commercial version of the T56-A-1. Allison has written to the airline presidents offering the Model 501-D10 for delivery in March 1957 at \$37,000 each. The GM subsidiary has asked CAA to witness the military qualification tests of the T56-A-1 preparatory to civil certification tests.

Convair would like to build either the Allison or Rolls-Royce-powered version of the 340, but American Airlines' interest in the four-engine approach, based on current state of the art in turboprop development, is a major consideration. Service experience with the military version of the Allison engine may alter AA's thinking.

ALTHOUGH DRASTIC, Rolls-Royce's action in reserving Dart production for Vickers into 1958 is understandable in the light of Britain's stake in the Viscount. Viscount sales to date represent \$84.8 million for dollar-short Britain, \$67 million of this from the Capital Airlines purchase. Yet, Viscount deliveries during the past two years have averaged less than two planes per month. To meet current commitments deliveries must average five planes per month for the next two years.

CAPITAL AIRLINES' Viscount costs are expected to be substantially lower than those of present operators of turboprop transports. British European Airways' figures (see page 37) are high by U. S. standards. Capital should be able to lower the break-even load factor well below BEA's for comparable operations, thus making the Viscount 700 series economic for shorter ranges.

FLIGHT LOG OF A TEN-YEAR TEAM: 20 BILLION MILES 65 MILLION HOURS!

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OTHER PUBLICATIONS AND SERVICES

American Aviation Daily: Daily news service for the entire industry. \$200 per year. Managing Editor—Keith Saunders.

American Aviation World-Wide Directory: Twice-yearly listing of products, people, and organizations. \$7.50 each. Managing Editor—Marion E. Grambow.

Official Airline Guide: Monthly publication of airline schedules and fares. \$13.50 per year in U.S.; \$14.00 in Canada; \$15.00 elsewhere. Published from 139 N. Clark St., Chicago 2, Ill. Phone: Central 6-5804. Managing Editor—Robert Parrish.

Air Traffic News (Incorporating Air Traffic Digest): Daily rates and tariff news. \$175 per year. Managing Editor—Wallace I. Longstreth.

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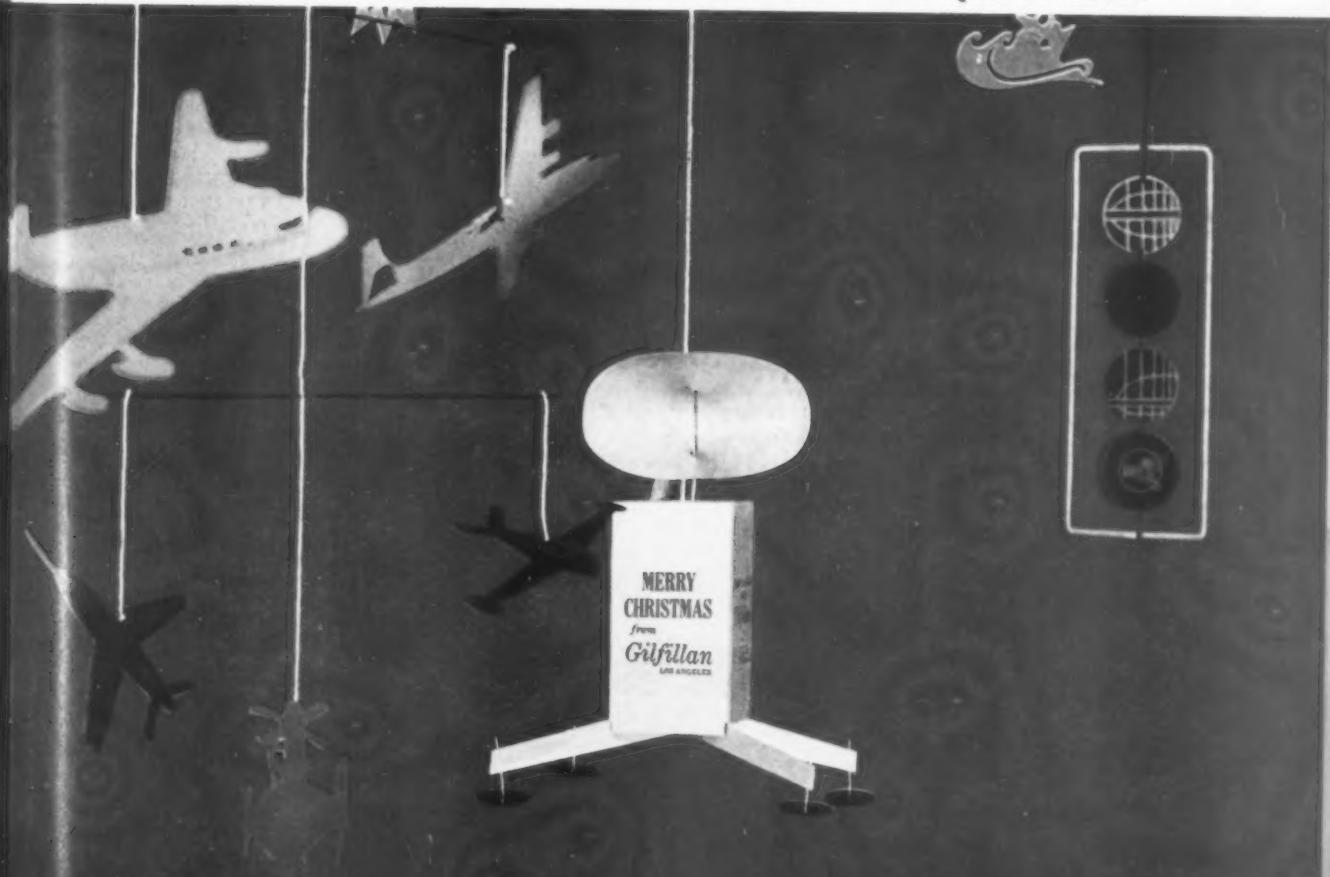
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AMERICAN AVIATION



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Letters

Letters should be addressed to *The Editor*, AMERICAN AVIATION Magazine, 1025 Vermont Ave., N. W., Washington 5, D. C. Anonymous letters will not be printed, but names will be withheld upon request.

Not G-E's Trouble

To the Editor:

Your mention that General Electric's jet engine plant here is under investigation by the Air Materiel Command (AMERICAN AVIATION, Nov. 22) has brought loud protests from our employees.

There is an investigation of USAF personnel here by AMC but it concerns USAF personnel and their civilian employees only. The General Electric Co. and its employees are not involved in any way.

I am enclosing an editorial from a local paper which I hope will help to clear up the misunderstanding.

T. C. IRVINE

General Electric Co.
Aircraft Gas Turbine Div.
Cincinnati, Ohio

GE Is Not Involved

There seems to be general misunderstanding about the investigation of Air Force personnel assigned to the General Electric plant at Evendale.

Because these men for the most part are working in General Electric buildings, the name of GE has been associated with the investigation.

But GE itself is not involved. Its people are not under investigation. GE is an innocent victim by reason of government contracts and geography. All those under investigation are direct employees of the Air Force.

The Post probably has been as guilty as other newspapers in associating in the public's mind the investigation and GE. We hope this editorial will set the record straight.

Above: From the Cincinnati Post

Consider Depreciation

To the Editor:

In *Airtrends* for November 8 (fifth item), you refer to a question that defies a reasonable answer by slide rule technique in advance of experimentation with real cold cash and elapsed time.

I suggest that business or executive aircraft belong to the same group (for analysis purposes) as regular profit-seeking transport aircraft in that they are expected to produce normal profits from the investment. Otherwise they are acquired for pleasure and prestige and the question of depreciation rate is a secondary consideration and may not necessarily be vital.

Your question indicates that the executive planes being considered are primarily business vehicles and therefore depreciation rates are a consideration. That being the case they would have to be operated at the same utilization rates as transport aircraft to permit a similar spread of depreciation over normal aircraft life.

The amount that the utilization rate for executive aircraft falls below that for transport aircraft indicates the portion that has to be charged off to pleasure and prestige operations as compared to that for direct profitable business operations.

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Riley 55
By



Given that the public transport aircraft operator can spread his depreciation over, say, seven years, and he must get a utilization of 10 hours per day, we find that the depreciation rate will work out to \$0.0083 per cruise horsepower hour in Canada, applying to aircraft purchased in USA.

In the case of the USA operator using a USA-built aircraft, the rate will work out somewhat less . . . say \$0.008. This rate is based on the purchase price of the aircraft complete without spares. Your statistician can try this approach on several aircraft of varied powers and capacities using the same life and utilization and you will find a striking similarity. For example, using the costs shown in your commentary . . . Convair \$800,000, using a cruise power of 2550, the rate will go up to \$0.0122, while the Learstar is \$0.0081 at 1550 cruise power.

D. W. ATKINSON
Winnipeg, Man.

Books

Aircraft Recognition Manual by C. H. Gibbs-Smith. Published in Britain by Putnam & Co. Ltd. and distributed in the U. S. by John de Graff Inc., 64 West 23rd Street, New York 10, N. Y. \$2.50. 239 pp.

Primarily for the aircraft spotter, this book describes over 200 types of civil and military aircraft now flying. There is a photo (sometimes two) of each type, plus a large number of three-view silhouettes. The book includes "a short introduction to recognition training" which is useful for instructors.

. . . AV

Flight Engineers Manual by Charles A. Zweng, third edition, published by the Pan-American Navigation Service, 12021 Ventura Blvd., North Hollywood, Calif. \$5.00. 304 pp.

All recent developments in aircraft, instruments, engines, and engineering techniques are included in this latest edition of a book which first appeared in 1947. New material on the Lockheed Super Constellation Model 1049 and on the Douglas DC-7 is featured in the compilation of technical theory, government regulations, and sample examination questions. Numerous photographs and diagrams.

. . . WK

The Light Metals Handbook by George A. Pagonis. Published by D. Van Nostrand Co. 250 Fourth Ave., N. Y., N. Y. Two volumes, approx. 200 pp. each. \$8.50.

Aluminum and magnesium alloys are analyzed at length in this handbook, which is really two books. In the first volume the text is presented. In the second are the tables, placed there to allow the reader to have the appropriate table conveniently before him as he is reading a given section of the text. Both types of alloys are examined by classes, mechanical properties, physical properties, casting characteristics, heat treatment, corrosion, machinability, joining methods, etc.

. . . WK



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When & Where

- Dec. 15—Air Transport Association board of directors meeting, Statler Hotel, Washington, D. C.
- Dec. 16—Air Transport Association membership committee meeting, Statler Hotel, Washington, D. C.
- Dec. 17—Eighteenth Wright Bros. Lecture, U. S. Chamber of Commerce Building Auditorium, Washington, D. C.
- Dec. 20—Eighteenth Wright Brothers Lecture, Los Angeles.
- Dec. 22—Eighteenth Wright Brothers Lecture, Cleveland.
- Jan. 24-26—Twenty-third annual mtg. of the Institute of the Aeronautical Sciences, Hotel Sheraton-Astor, New York City (including Honors Night Dinner).
- Feb. 20-22—Fourth annual Texas Agricultural Aviation Conference, A&M College of Texas, College Station, Tex.
- Mar. 11—Institute of the Aeronautical Sciences national flight propulsion mtg. (restricted), Hotel Carter, Cleveland.
- Mar. 28-Apr. 1—Ninth Western Metal Exposition, Pan-Pacific Auditorium, Los Angeles.
- Mar. 28-Apr. 1—American Society for Metals exposition and congress (including all-day session on aircraft and rocketry sponsored by the American Welding Society), Pan Pacific Auditorium and Ambassador Hotel, Los Angeles.
- Mar. 31-Apr. 1—Symposium on Boundary Layer Effects in Aerodynamics, National Physical Laboratory, Teddington, England.
- Apr. 5—International Air Transport Association technical conference, San Juan, P. R.
- Apr. 18-21—Society of Automotive Engineers, Golden Anniversary aeroponic mtg., aeronautic product forum and aircraft engineering display, Hotel Statler and McAlpin Hotel, New York City.
- Apr. 29—Institute of Navigation's eastern regional mtg., Friendship International Airport, Baltimore.
- May 2-5—Society of Aeronautical Engineers annual national conference, Hilton Hotel, Fort Worth.
- May 4-6—Fourth International Aviation Trade Show, 69th Regiment Armory, New York City.
- June 21-24—Joint mtg. of the Institute of the Aeronautical Sciences and the Royal Aeronautical Society of Great Britain, LAS Building, Los Angeles.
- June 23-25—Institute of Navigation annual mtg., Air University, Maxwell AFB, Ala.

MOOD BEAMS

1

Mary Locklier is happy — and we're ALL happy

— about the major role Southwest Airmotive was privileged to play in planning and staging the National Business Aircraft Association's epochal 1954 convention. With others from throughout the land, we had a hand in shaping real aviation history in keeping with a 22-year-old SAC tradition

of supporting worthy industry projects.

Keep your eyes on NBAA. If, mean-

time, they stray to our Mary, she's

25, 110 lbs., 5'2", with green eyes,

brown hair. And, say there—

HAPPY CHRISTMAS and '55!



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COMPANY

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12

Dec. 20, 1954 - Vol. 18, No. 15

IN THIS ISSUE

FEATURE NEWS

In U.S. Turboprop Transport Race Lockheed May Be a Year Ahead	21
Industry-type Organization Recommended for MATS	23
U.S. Procurement Policy Stabilizes Industry	26
Federal Aid to Which Airports?	30
Interview with Herbert Sammons: Elands for the U.S.	32
Capital Ups Its Order To 60 Viscounts	37
Break-Up of the "Rhombus"	42
What Are the Answers To Heat Problems?	43
Future of Surface-Mail-By-Air Experiment Now Up to Courts	51
Board Votes Permanency for Northwest in Alaska-Pacific	54

DEPARTMENTS

Airtrends	3
Letters	8
Books	10
When & Where	12
Personal View	17
Industry Spotlight	19
News	24
News Briefs	25
Business	26
Pulse of the Industry	28
West Coast Talk	45
New Products & Processes	46
People	50
CAB News	51
Honor Roll	54
Airline Commentary	58
International Aviation	60
En Route	62
Classified Advertising	64
Technical Literature	65
Advertisers Index	66

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AMERICAN AVIATION



FIRST PAN AM SUPER STRATOCRUISER to use the new G-E turbosupercharger is the "Clipper Mayflower." Improved turbo allows cowl flaps above mechanic's head to be drawn in closer to the engines to reduce drag.

NEW G-E turbosupercharger kit boosts Stratocruiser's speed, range and payload

Now . . . at no increase in operating cost, Pan American's Boeing Super Stratocruiser fleet can make daily, non-stop flights from New York to Europe.

General Electric's new CH-10 modification kit contains all parts needed to install a *slightly larger turbine wheel* to replace the one now used in Boeing Stratocruiser turbos. This new wheel reduces back-pressure on R-4360 engines. It lowers engine cylinder temperatures. By reducing cooling air requirements, it permits drawing the cowl flaps closer to the engines to reduce drag, increase flight speed.

On Pan American's forthcoming Super Stratocruiser flights from New York to London and Paris, the CH-10 turbosupercharger helps make possible a 95-mile range increase; a five-knot speed increase; plus several hundred extra pounds of load capacity. Now it is possible, also, for Super Stratocruiser flights

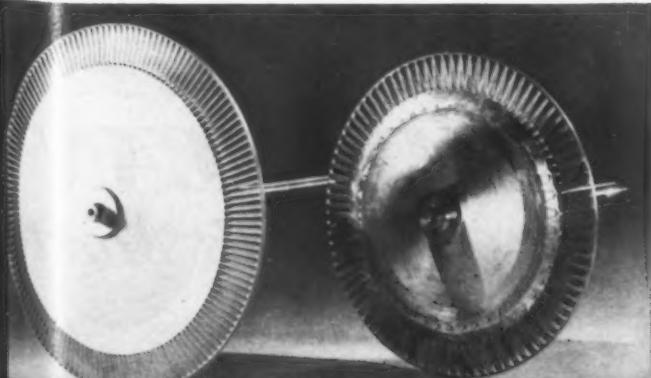
to bypass the traditional West/East refueling stop at Gander, Newfoundland—a stop all other un-modified Stratocruisers continue to make!

For further application data on the CH-10 modification kit, contact a G-E Aircraft Specialist via your nearest G-E Apparatus Sales Office. If you wish, write to *Section 231-2, General Electric Company, Schenectady 5, N. Y.*

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LARGER TURBINE WHEEL (left) is key component in General Electric modification kit. It's easy to install—only four parts must be replaced.



TRANS-ATLANTIC PAN AM FLEET will be fitted with CH-10's by Dec. 15. U.S. Air Force planes offer other possible applications.

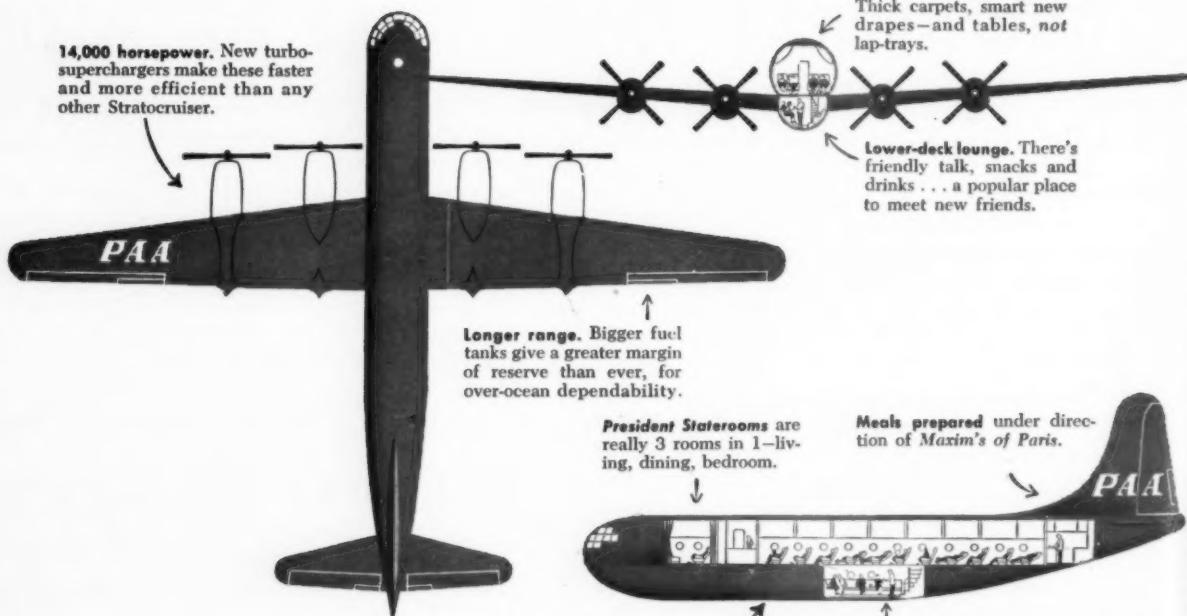




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NON STOP to PARIS or

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These great airliners are super-powered. Each is equipped with 4 new turbo-superchargers—new propellers—more fuel capacity for increased over-ocean dependability.

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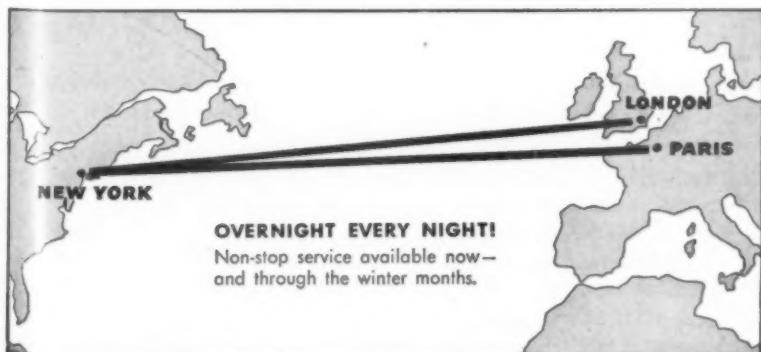
the weather, to PARIS OR LONDON. You'll land refreshed, ready for work or fun, in the morning . . . because you will have crossed the Atlantic **NON-STOP!**

An all-sleeper service. Stretch out your feet as far as you can—yours can't touch the seat in front! Yours reclines to *bed-length!* That's *Sleeperette** service . . . another Pan Am exclusive. If you choose, reserve a berth—foam-soft—at slight extra cost.

Superb "President" service. Cocktails, or your favorite refreshment, appear tinkling at your elbow. With hors d'oeuvres, of course. Then, somehow, you sense Paris is near. Meals prepared by renowned *Maxim's of Paris* are being served! Whether it's *Breast of Chicken Veronique*—*Filet Mignon Rossini*—or some other specialty—*Maxim's* gives it a unique touch of excitement and romance.

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Another "plus" for America's most luxurious skyliners

Something new has been added to the name of Pan American World Airway's Stratocruisers. It is the designation "Super," which the airline is applying to its Boeing Stratocruisers after installing new turbosuperchargers, new propellers and extra fuel tanks. These Super Stratocruisers will be able to handle Pan American's daily flights to Europe on regular nonstop schedules.

From the very first, the traveling public has shown a marked preference for the big, quiet, roomy Boeings. The lower-deck lounge, an exclusive feature, affords a welcome roam-around break,

particularly on long-distance flights. And the greater quiet and roomier seats are other repeat-business advantages.

During their years of service on domestic and global routes, Boeing Stratocruisers have carried over two and three-quarter million passengers, and have flown more than 150,000,000 miles in commercial service. They've completed almost 25,000 trans-ocean crossings. In addition to this vast background of commercial flying, the Stratocruisers' military counterparts, the C-97s, have for years operated throughout the world as cargo, personnel

and hospital ships for the Military Air Transport Service, and as tanker-transports for Strategic Air Command.

Pan American's trans-Pacific Stratocruisers fly the longest non-stop over-water leg of any U. S. certified commercial airline, the 3,846-mile aerial voyage from Tokyo to Honolulu. On this route, flying the high-altitude jet streams, the Stratocruiser logs the fastest block-to-block speed currently scheduled for any airplane, 344 miles per hour.

Now, Pan American's newly modified Super Stratocruisers will be able to turn in even more impressive performances.

BOEING
AMERICAN AVIATION

Deterioration

FOR THOSE WHO HAVE KNOWN the Civil Aeronautics Board best through the years since its creation in 1938, its steady deterioration especially during the past several years has been the source of increasing alarm and concern. Unless there is a positive change of direction, there can be nothing but trouble ahead—trouble which will be to the detriment of the entire air transport industry.

The Eisenhower Administration has been aware of this deterioration. Many promises of corrective action have been made. But so far nothing has happened to halt the decline of this vital five-man board which was created in 1938 as a quasi-judicial agency.

The sad truth is that CAB is no longer functioning as a quasi-judicial body. It relies on expensive and painstakingly prepared records only to support language and points for decisions which, in many cases, have been made months before the cases were even formally submitted to it, and sometimes before cases have even begun.

One observer who knows the CAB intimately, has this to say: *"All five members appear to be caught in the tide of an intangible force which compels them to put their personal reasons, ambitions, antagonisms, and political alliances ahead of the judicial reasoning which the Civil*

Aeronautics Act requires. At the present time not one member of the board is voting as an impartial judge."

Another close observer commented recently that every case before the board is like a crackerjack box—"a prize in every package." Weighty problems are getting only cursory attention. No real thinking is going into the votes. It isn't crookedness that prevails—it's a shallowness arising from the weight of pressures, personal feelings, and politics. For the past six months the situation has become more embroiled than ever through the rivalries of the three Republican members, one wanting to be reappointed and all three wanting to be chairman.

The airlines themselves are being criticized for the political and other pressures they're exerting on pending cases. Those who say they don't want to win cases by the back door insist they have to do so because their competitors do, so it's a matter of self-defense. There is considerable logic in the argument, for the board itself has within its power the ability to stop backdoor maneuvering.

Those who want the board to succeed and those who have watched it closely through the years are genuinely alarmed. Continuation of the present trend will lead to major trouble; the explosion won't be pleasant for anyone.

Which Side?

EMPLOYEES of five airlines who belong to the Brotherhood of Railway Clerks must be somewhat embarrassed and perplexed these days. If not, they should be.

Their union, the one they pay dues to and which they have chosen as their bargaining agent, is aiding the railroads in their battle against the further extension of the surface mail-by-air scheme and against the airlines generally.

Those airline employees belonging to this railroad union might try to figure out what possible benefits can be achieved by an organization assisting a general anti-airline crusade. The Brotherhood of Railway Clerks can't be on both sides at the same time and it's mighty clear so far which side it's definitely on.

why not reverse the procedure and issue stickers requesting mail to go by rail if the patron so desires?

If anyone really wants the slow method, he should be entitled to it, even if it costs more. Otherwise all first class mail should automatically go by air whenever and wherever air is faster.

Mr. Murray

THE RESIGNATION of Robert B. Murray, Jr., as Under Secretary of Commerce is effective January 20. Since we have been among his severest critics, it is only fair to say that not all of Mr. Murray's activities and works have been bad and that during recent months he has performed constructively in various ways. The job of Under Secretary of Commerce is a thankless and difficult one at best, made even more irksome by the lack of specific power.

Probably at the root of Mr. Murray's initial troubles was poor advice. Often he spoke conclusively without sufficient facts or study. But the air policy report of the Air Coordinating Committee which he largely headed up, has turned out to be more commendatory than otherwise. In the federal airport aid field he has come around to a sensible approach in the past six months. And a recent speech on local airlines was both thoughtful and constructive.

We have found much with which to disagree during the past two years, but it is only fair and just to keep the record in balance.

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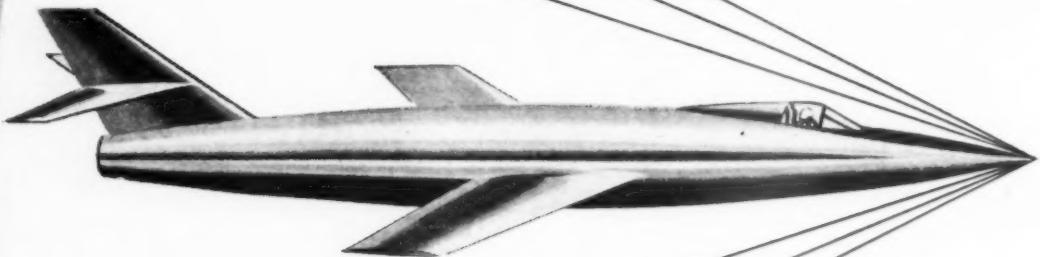
Although Europe did away with airmail stickers and premium prices for sending mail by air almost 20 years ago, we're just getting around to fast distribution without surcharge in this country.

Instead of being forced to pay extra and attach an airmail sticker to make sure the fastest means is utilized,

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Behind these achievements — and more — are not only eminent Curtiss-Wright pioneers, but highly specialized laboratory facilities for development and testing of engine power... test

chambers that recreate altitude and temperature conditions of actual flights — batteries of recorders that read 40 different temperatures within 20 seconds—fuel flow records on punch cards that yield in seconds performance data that would ordinarily take hundreds of man hours to calculate — an automatic camera that pictures 120 separate pressure manometers at a single exposure — and even tape recorders to preserve all verbal orders and observations.

Such a combination of experience and research in engine development adds impressively to America's defense program today, and provides a solid foundation for the progressive air power needs of the future.

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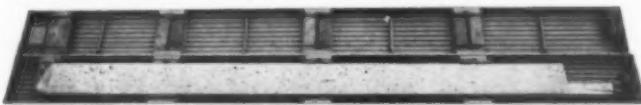
World's Finest Aircraft Engines

Industry Spotlight

• Glenn L. Martin Company is experimenting with a honeycomb-type wing for the B-57 light bomber. Martin is reportedly producing eight sets of the new wings which are essentially developments of the honeycomb wing used on the Martin Matador missile. Aluminum sheet used over the honeycomb is reportedly so thin, about .008 inches, that it is shipped rolled up in tubular containers.

• Convair's XB-58 Hustler bomber will use sandwich-type construction in the wings to help minimize the heat problem. Engineers at the AMSE meeting in New York indicated that sandwich construction is very effective in increasing the time lapse between application of heat to the wing skin and its transmission to the fuel.

• Kaiser Metal Products, Inc., Bristol, Pa., has developed a new lightweight shipping container for helicopter rotor blades and one of the major helicopter manufacturers is scheduled to start testing of the unit late this month.



Unit is made of thin gauge aluminum, weighs 240 pounds. It is 27 feet long, 26 inches wide, and 12½ inches deep.

• A transistorized autopilot has made a successful flight in a B-25 and a second one is being ground tested at Wright Air Development Center in a Lockheed F-94C. Both units are Eclipse-Pioneer PB-20 autopilots with transistors replacing electron tubes.

• Pratt & Whitney R-4360-35 engines in the C-97's and KC-97 planes operated by Military Air Transport Service and Strategic Air Command will be converted to the B-6 type when they go through Air Materiel Command depots for regular overhaul. Rework, similar to that recently completed by the airline operators of Stratocruisers, includes a new engine nose section, magneto drive section, power section, and provision of low-tension ignition systems.

• Goodyear Aircraft Corp.'s GA-400R one-man helicopter, which made its first flight on May 9, can fly at speeds up to 60 knots. Designed and built in prototype form in 10 weeks, the GA-400R would be used for both tactical and training purposes.

• Piasecki's HUP-4 helicopter is scheduled to fly before the first of the year. This is the version powered by a Wright R-1300 (replacing the Continental 975). HUP-4 will have authorized cruise power of 600, up 125 horsepower. This power is governed by transmission system design, but future models would have redesigned transmission. The Navy copter will have more payload, greater range, and higher speed.

• Dimensions of McDonnell's F-101A Voodoo are: wing span 39.7 feet, length 64.4 feet, and height 18 feet. Wing and stabilizer of the F-101A have 35° sweep. There were no "X" or "Y" models of the plane which carries most of its fuel in the fuselage and is capable of carrying atomic weapons.

• Although Cessna plans on stepping up production of its twin-engine Model 310 to one a day in the spring, production is sold out through August.

• A compound-type version of the Franklin model O-425 engine has been developed by Aircooled Motors, Inc., under sponsorship of the Army Transportation Corps. Designated the model O-425-13, the turbosupercharged engine is now installed in an Army H-18 helicopter which is undergoing tie-down tests.

• Report on the VOR-DME/Tacan dispute, prepared by a three-man committee of scientists, was submitted to the Air Navigation Development Board's VORTAC committee early this month and a decision on the controversial navigation system dispute is due before year's end.

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The H-16 Standard Course Checker is a companion instrument to the H-14. It makes possible a precise check on the course-accuracy of the H-14 or of any other omni signal generator. Just as a frequency meter is necessary in connection with a variable frequency signal generator, the H-16 Standard Course Checker is required in connection with a VOR signal generator for a precise measurement of phase accuracy.



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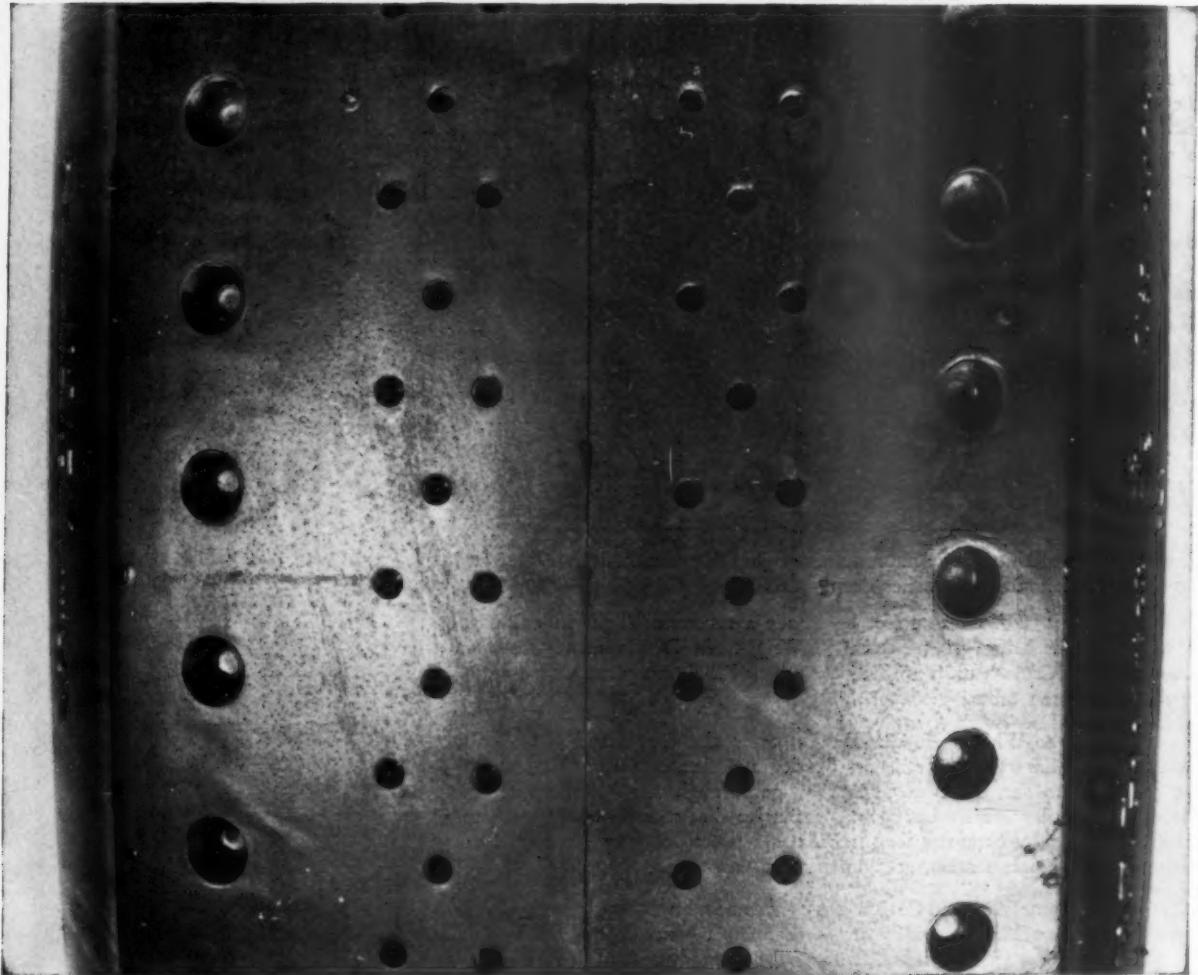
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FIRST IN RUBBER



New fire puts more rubber to work to give even more landings

STARTING IN 1948, airline after airline put the B. F. Goodrich Dimpled Tire through the most extensive comparison tests. And it outwore all others—sometimes by as much as 27%.

Within 5 years, it was adopted by 24 airlines. The reason: dimple-like indentations resulted in better load distribution throughout a larger tread area. Wear was slower and more even with greater protection against tread cutting. It all added up to more landings before recapping.

Latest development in B. F. Goodrich Dimpled Tires is shown above. It is giving even more landings because it

puts even more rubber to work. Dimples are sized, spaced and arranged to give an improved wear pattern. The tread is flatter to give a broader footprint the instant the tire touches the runway. Thus, wear is spread more evenly from shoulder to shoulder. In addition, the tread is made from new, longer-lasting rubber compounds.

Preliminary reports from current airline tests indicate the new B. F. Goodrich Dimpled Tire gives substantially more landings than any other kind of tire.

Although production of this BFG Dimpled Tire is still limited, it will soon be available in most popular sizes.

The new B. F. Goodrich Dimpled Tire is one of many "firsts" in aviation tires from B. F. Goodrich, leader in rubber research and engineering.

Another recent "first" is the famous B. F. Goodrich Tubeless Tire for combat jets. Other BFG products for aviation include wheels and brakes, De-Icers, heated rubber, Pressure Sealing Zippers, Avtrim, inflatable seals, fuel and oil cells, Rivnuts, hose and other accessories. *The B. F. Goodrich Co., Aeronautical Sales, Akron, Ohio.*

B.F. Goodrich
FIRST IN RUBBER

ESTABLISHED JUNE 1, 1937



VOL. 18, NO. 15

In the U.S. turboprop transport race . . .

LOCKHEED MAY BE A YEAR AHEAD

BY FRED S. HUNTER

THIS TIMING may be said to overshadow all other considerations in Lockheed's Model 1449 turboprop Super Constellation project.

The Burbank manufacturer's estimate that the Model 1449 will be in airline service in the spring of 1957 could put it the better part of a year ahead in the U. S. turbine transport calendar.

There are two other considerations that loom large in the picture. One is the new, larger wing, which will add substantially to both speed and fuel capacity. Pratt & Whitney's improvement in the economics of the single-spool PT2 commercial version of its T34 turboprop engine is the other.

Topping the list of developments which make the P&W turboprop powerplant more attractive for commercial-type operations is an 8% improvement in specific fuel consumption. The total saving in fuel cost is boosted to approximately 14% by further improvements in turbine efficiency and reduction gear adjustments in keeping with a commercial engine. The PT2's reduction gear reduces engine speed in two steps to an 11:1 ratio. Engine flight operating speed is between 10,000 and 11,000 rpm with corresponding propeller speed of 910 to 1000 rpm, thus keeping propeller tip speed in the subsonic range.

Still another important operating cost factor is represented by new figures on overhaul costs. These are given additional validity by a Pratt & Whitney warranty that the cost of engine replacement parts during the first two years of operation will not exceed a certain amount, reportedly about \$20 per flight hour. This is the first time P&W ever has offered to make such a guarantee on parts replacement. Engine overhaul time on the PT2 will start out at 500 hours.

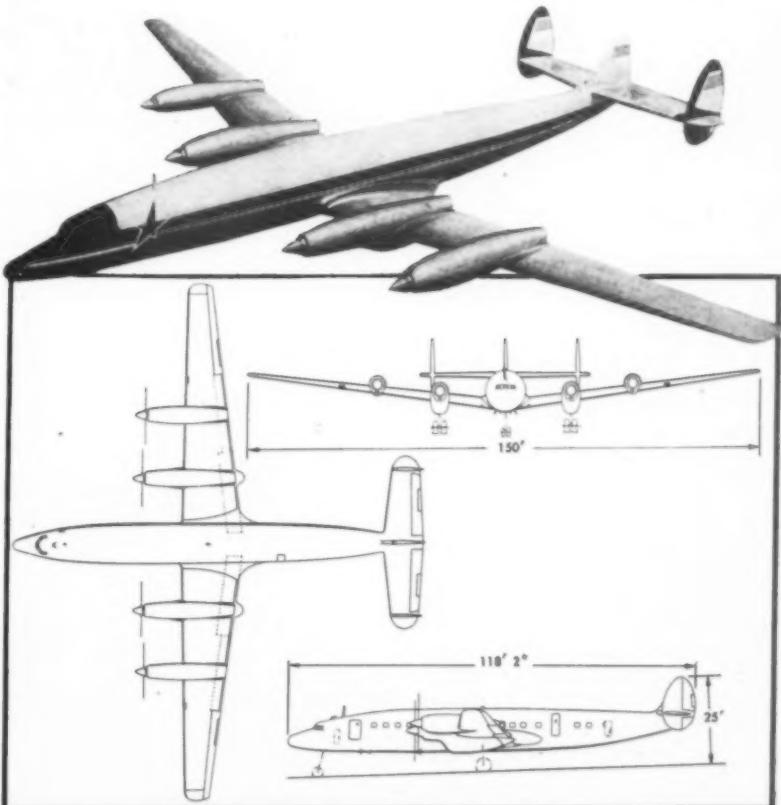
Lockheed already is moving along on the Model 1449 program:

- Work on tooling has started.
- The schedule of planning, production, and testing calls for the completion of four test airplanes in the last half of 1956. CAA type certification is sought by March 1957.

• First production planes—up to half a dozen, perhaps—will already have become available as NX planes for purchasers to use for crew familiarization pending issuance of the formal CAA ticket.

• Full-scale production of five planes a month is to be reached by mid-1957.

This is a fast program, but Lockheed feels it will be able to make schedule. One element of uncertainty is how long it will take to TC the plane. The CAA will have had some experience on turboprop certification from the Viscount, but it is still reasonable to assume it will want to take a longer look at the new-style Connie than it would require for a conventional, piston-powered transport. It's a foregone con-



Lockheed's projected Model 1449 turboprop.
A new, larger wing and twice the horsepower

clusion it will require service testing of at least 200 hours. It apparently is in recognition of unprecedented circumstances such as this that Lockheed plans to use four airplanes for testing. One of these it will retain. The other three will be completed later on for delivery to customers.

The Model 1449, with its thin wing, takes over where the Model 1249 left off. Lockheed has been working on the idea of powering the Super Constellation with turboprop engines ever since it added 18 feet to the Model 749 Constellation and began calling it the Super Constellation. As a matter of fact, the first announcement of the piston-powered Super Constellation pointed out that the airplane could be converted to turboprops when this type engine became available commercially.

Later on, Lockheed put together proposed specifications for a Super Constellation equipped with P&W T34 engines and called it the Model 1249. A similar Super Constellation incorporating Allison T38 engines was called the Model 1149, but it never got past the paper stage.

For a brief period in 1952, enthusiasm for the turboprop Model 1249 ran high at speed-minded Lockheed, and the plane has since become a reality in military configurations in the Navy R7V-2, now being test flown, and the Air Force YC-121F, due soon. But Lockheed had to set the commercial project back because the engines weren't ready and cost figures at that time were a bit on the foreboding side. Pratt & Whitney indicated the cost of a T34 engine-propeller combination might very well exceed \$200,000, with the engine itself \$175,000.

Prices have since come down. Recently P&W was reported quoting an airline price of \$130,000 on the PT2, and still more recent advices indicate this may be reduced to approximately \$110,000 in production. Propeller price is approximately \$30,000.

Now, with the new engine economies plus the new wing, Lockheed has the Model 1449 which it promises will have a "significantly lower seat-mile cost than any competitive plane." Lockheed hasn't completed all its final figures, but its direct operating cost curve as of the moment shows approximately 1.6¢ per 200-lb.-mile at flight distances over 2000 miles. For stage lengths like New York-Chicago, the Model 1449's direct costs would be with 1.77¢ per 200-lb.-mile, Lockheed says.

The new 15% wing (compared to 18% for the present Constellation series) serves several purposes in contributing to improved performance. Its high-speed airfoil tucks approximately 25 mph onto the cruising speed. Before Lockheed

decided to go all out on the Super Constellation and extend it to turboprop power, the Burbank manufacturer had contemplated installing the new wing with Wright EA1 engines to accomplish the 25 mph increase in cruising speed in the turbocompound configuration.

Indications are that Lockheed will describe its projected Model 1449 turboprop Super Constellation as having a speed of 445 mph. It will be 30 mph faster than any projected propeller-driven, long-range commercial transport.

Lockheed also says the Model 1449's block speed will be more than 75 mph faster than any contemporary or envisaged piston-engine commercial transport. At maximum cruise power at 30,000 feet, the turboprop craft attains a block speed of 400 mph at a flight distance of approximately 3000 miles. For a stage length like New York-Chicago the block speed would be approximately 360 mph.

tion. Being new, the wing's design speed limit can be upped substantially above that of present Constellations, probably to about Mach .85.

With 206 square feet more wing area and integrally stiffened skin from root to tip on both top and bottom surfaces, the new wing opens the way to a new fuel system having a capacity of 10,200 gallons of internal fuel. This is enough, Lockheed says, to carry a space-limited payload of 17,250 pounds 4200 miles at maximum cruise power at 30,000 feet altitude or 4600 miles at long-range cruise power. Airlines also will

be pleased to know that the location of the inboard nacelles will allow 5½-foot propeller-to-fuselage clearance.

The Model 1449 can be operated on and off 6000-foot runways.

Despite the fact that Lockheed is almost doubling the power of the Super Constellation, it is lengthening the cabin only 55 inches and is assuming only 64 passengers (60 plus four in lounge) for a standard first-class interior.

The Model 1449 makes a second large-scale turboprop project for Lockheed, the other being the Air Force C-130 at its Georgia division. It's also working diligently in trying to land a third. This is its entry in C. R. Smith's informal competition for a smaller-size four-engine turboprop which could be used as a replacement for American Airlines' Convair 240's.

Higher performance of the Model 1449 involves a number of changes in systems as compared to current turbocompound Super Connies:

- Replacement of de-icing boots with thermal anti-icing of wing and tail.
- New cabin pressurization for an 8000-foot cabin altitude at 30,000-foot airplane altitude (using engine bleed to drive air-driven turbines for pressure source).
- New dual hydraulic system with each system operated by different pairs of engines.
- New push-pull control systems for ailerons, rudders, and elevators with twin-cylinder hydraulic boost for each control surface.
- New irreversible flap system.
- New landing gear which also is designed to be used as dive brakes.

Lockheed hasn't publicly disclosed the price on the Model 1449, but it probably will be between \$2.5-3 million.



SALVAGER. A Piasecki H-21C helicopter, the Army's newest and biggest, returns an L-19 to Marshall Field, Kas., after picking the plane off a sand bar in the Kansas River. The 22-place chopper first transported a crew to rig a sling on the L-19.

Cooper Committee recommends . . .

Industry-Type Organization for MATS

PEDEGON plans to reorganize Military Air Transport Service have been both speeded up and sharply adjusted as a result of a critical special report sent to Defense Secretary Charles E. Wilson from his Advisory Committee on Fiscal Organization and Procedures, also known as the Cooper Committee.

The report calls for the complete separation of air transport activities from other responsibilities, the adoption of a double entry, commercial-type accounting system (*or the industrial fund system*) as used by the Military Sea Transport System, and recommends that MATS be the "sole provider of airlift activity for the Defense Department."

If MATS is to become the sole provider of airlift for the Defense Department, it would apparently bring an end to the separate transport forces of the Strategic Air Command, Caribbean Command, and others, including those in the U. S. Navy.

MATS officials are not too displeased with the Cooper Committee report as it highlights many of the handicaps under which they are operating. Their fiscal officers point out that they do not have control of all funds charged to their operations and that while they are supposed to be a Defense Department transportation activity, they have a number of Air Force and other activities attached to their organization—i.e., the air defense of Iceland.

Estimated annual operating cost of MATS is \$500 million dollars (*although this may not be all-inclusive*) but officials point out that 19% of this amount goes for the Airway and Air Communication Service, 9% to the Air Weather Service, 7% to the Air Photo and Charting Service, and 6% for Air Rescue. MATS claims that less than one-third of its operating expense is for air transport but Pentagon estimates place this figure at about one-half.

There are various ways of looking at the MATS function. The tendency is to compare MATS costs with those of Pan American World Airways (\$190 million) or the domestic and overseas operation of TWA (\$176 million). MATS officials think a more fair comparison of operating expenses is that of \$658 million of the Military Sea Transport Service.

Defense Department's experience with MSTS will undoubtedly influence early action on the report. Assistant Defense Secretary Wilfred J. McNeil,

comptroller of the Defense Department and one of the two Pentagon members on the Cooper Committee, recently told Congress:

"The operation of the Military Sea Transport Service under the business or corporate type system is saving Uncle Sam about \$250 million a year over what it cost three years ago to handle the same volume of traffic. How this saving is being achieved, I think, is one of the really dramatic things that has been going on in the Department of Defense.

"In 1950 it was costing us 3.73 cents a mile to move a passenger at sea. Progressively that has been dropping. In 1951, it was 3.18 cents. In the first part of 1954 it was costing 1.88 cents per mile, and a 10% tariff reduction went into effect on January 1, which will bring it down to 1.69 cents per mile. In spite of the fact that we have had terrific increases in labor, fuel costs, overall costs, that is the net result in the Military Sea Transport Service.

"I think that is a very dramatic story. The value of these intelligent savings is \$250 million a year to the Department of Defense, and the budget this year is based on the lower rates. This is much more than the cost of the equipment for an infantry division, a Forrestal-class carrier or the equipment and maintenance of a fighter wing for the Air Force or Naval Aviation."

Industrial funding for defense activities came into existence as a result of legislation in Section 405 of Title

IV of the National Security Act Amendments of 1949, providing for the establishment of working capital funds. It includes as items of expense almost all cost items accepted in commercial accounting except taxes and certain kinds of insurance.

For MATS it would include depreciation of transport planes and buildings, every expense in bases operated by MATS, both military and civilian pay and federal retirement contributions, rental and landing fees on all bases used, and maintenance of all aircraft, tools, and supplies. The double entry bookkeeping system would show operating costs and income of every office and all air routes.

McNeil is largely responsible for the use of this type funding in 39 commercial-type defense activities and is enthusiastic over the results. These fiscal installations include 11 shipyards, the Naval Gun Factory, nine Army arsenals, a clothing factory, and numerous printing plants. One of these installations, a printing plant of eight units, belongs to the USAF.

Advantages of industrial funding applied to MATS operations are cited as:

- Provide powerful incentive to effective cost control and efficient management by emphasizing the relationship of operating expenses and income from each service as measured by a definite gain or loss. Thus, when airlift requirements fall off in any area, steps are taken to reduce personnel and related expenses, transfer aircraft and equipment elsewhere, and bring expenses back into balance.

- Provide an intelligent basis for planning by local management through the availability of monthly operating reports and financial statements. Effi-



BOX CAR SIZE of the USAF C-130A Hercules medium transport is demonstrated as a 5000-gallon gasoline truck trailer and tractor back into the turboprop-powered aircraft during mock-up loading trials at the Georgia Division (Marietta) of Lockheed.

ency and usefulness of local bases would then be determined in the same manner as a factory evaluates a branch office on a profit and loss basis.

- Provide operating costs where none are now available—i.e., depreciation of aircraft and hangars, rental and landing costs, and more realistic values for other expenses, including overhead.

- Facilitate accurate determination of cargo handling costs by commercial air commodity classifications and military personnel movement and related processing costs, thus providing a sound basis for customer billing as well as a useful management tool.

- Enable direct billing of customers thus promoting cost consciousness, assuring better customer planning and better utilization of space.

- Provide a means of measuring actual performance through establishment of engineered cost standards.

Criticizing the fact that "certain air transport operations are being made by other Air Force commands and other branches of the armed services, the Cooper report states that all such operations should be consolidated under MATS. Then it could be determined on a cost basis what airlift requirements would be most efficiently met by utilization of MATS aircraft and military personnel or competitive bid contract operation with commercial airlines.

Referring to the four Navy squadrons assigned to MATS, the report hints broadly that it might be economical to change this arrangement. If advisable to have the Navy participate, it should "be performed on a reimbursable basis."

• • •

NWA Debt-Free, Plans Equipment Purchase

For the second time in seven years, Northwest Airlines is free of outstanding bank loans or other long-term debt. NWA paid off \$1.8 million in loan payments on Oct. 29, and although a new credit agreement is dated Nov. 1, there has been no borrowing under it thus far. Northwest was in a similar position on Dec. 31, 1947.

The latest bank credit is for \$18 million, which will permit the purchase of four Lockheed Super Constellation 1049G's and six Douglas DC-6B's, plus spares. Investment in the 10 planes will total some \$3 million more than the credit, according to NWA president Donald W. Nyrop.

The terms of the credit arrangement contrast favorably with the earlier bank loan. The new agreement is unsecured, has a lower interest rate ($3\frac{3}{4}\%$ on loan balances, vs. 4%), has terms ex-

tending over six years instead of five, requires maintenance of a smaller amount of working capital, makes more of the net income available for dividends, and requires no cash collateral accounts or similar application of funds from sale of assets.

Carriers Not Obsolete Says Smith

James H. Smith, Jr., Assistant Secretary of the Navy for Air, has emphasized the need for U. S. military services to eliminate some of the lower priority weapons. Smith said "we must get rid" of some of the more obsolete types now being produced by the services, adding that "the situation is not being faced as realistically as it should be."

To counteract recent statements by British Field Marshal Montgomery, however, Smith said the Navy would always need aircraft carriers because they provide the "characteristic of mobility of base." Montgomery had discounted the need for carriers in recent addresses.

Smith also mentioned that the Navy's Martin P6M Seamaster, first turbojet-powered water-based patrol plane, would fly next spring and would be paired with a submarine tanker for operations on virtually any sea. He said the Convair XF2Y-1 Sea Dart, first water-based jet fighter, had not yet been ordered in quantity, but "we are working hard" on this plane.

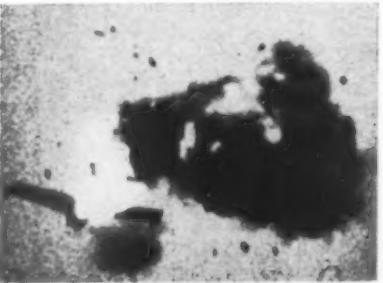
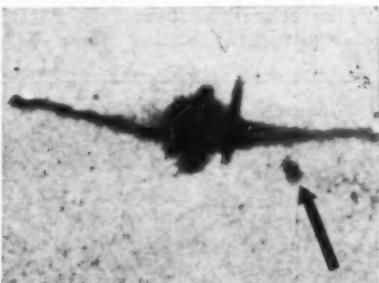
Tight Controls Placed On New Facilities

A new Defense Department directive (No. 4275.2, dated Nov. 24) is placing industrial facilities construction under tighter control. The directive, which becomes effective 60 days after issue, stipulates that Secretary Wilson will approve (or disapprove) each Army, Navy, or AF industrial facilities project estimated to cost \$1 million or more. Previously, the secretaries of each military service authorized such projects.

The new order also requires each military service to submit an annual review to the Defense Department of all proposed industrial facilities projects.

Emphasizing that full consideration shall be given to the use of existing government facilities, the directive states that "no test facilities shall be constructed at a privately owned plant if such facilities duplicate centralized test facilities already available, unless they are justified by current and planned procurement programs."

In addition to the tighter control that is expected, Pentagon observers feel the new order will mean more Defense Department emphasis on the use of privately owned facilities and better coordination among the services on acquisition, construction, rehabilitation, and major repairs of property for production of military end-items and facilities for research and development in support of production. The directive does not apply to projects in the Public Works Program.



SPARROW IN ACTION

The air-to-air Sparrow missile is shown in action in these unusual Navy photos. At right the rocket-powered Sparrow can be seen being launched experimentally from a plane, tail of which is visible in the upper righthand corner of photo. Above, arrow points to the missile tracking down its target just before impact. Upper right shows the devastating result.



Pike Speeds Up Price Revision Proceedings

At the urging of the Business Advisory Committee on Procurement, Assistant Defense Secretary (Supply & Logistics) T. P. Pike has issued a directive (Nov. 23, 1954) designed to expedite price revision proceedings under fixed-price contracts with redetermination clauses. Contracting officers are notified it is not necessary to use Section XV as "a working guide."

Consideration will be given to the contractor's general performance, efficiency, economy, and ingenuity. Also to be considered are "delivery schedules, quality of product, extent of subcontracting." Contracting officers should "rely on educated judgment and not on mechanical rules or formulas."

"Negotiation shall be conducted promptly," and shall not be made solely on the basis of cost and profit.

Record-Breaking Year For United

Business is better than ever and promises to stay that way for United Air Lines, predicts President W. A. Patterson. This year was a record-breaking traffic year for UAL, with the number of passengers 21% higher (4.78 million) and the number of passenger-miles up 22% (3.32 billion). The rise will continue through next year, predicts Patterson, with increases of 15% in passenger-miles, 4% in mail, and 10% in cargo. Coach traffic may rise from 27% of the available seat-miles to 32%.

News Briefs

A nuclear power division has been set up by the Glenn L. Martin Co. Head is Tibor Nagey, formerly with the NACA's Lewis Laboratory. Projects on heat exchangers are already underway. . . . Employment in the aircraft industry in September was almost up to the 800,000 mark, which it had topped during the first seven months of the year. Over 495,000 were in airframe manufacture. . . . Construction of a wind tunnel for speeds up to Mach 3.5 was started this month by North American Aviation. The test section will be seven feet square, 17 feet long. Completion is scheduled for March 1956.

The price of titanium sponge has been cut by du Pont, the second such move this year. Prices are down 22¢ and 46¢ on grades A-1 and A-2, respectively. . . . A new fixed-pitch propeller, developed by Sensenich Corp., is standard equipment on 1955 Piper

PA-18 and PA-22 models. The propeller is designed for 125-hp to 165-hp engines, weighs 29½ pounds, measures 74 inches. . . . A single-axis autopilot is under development by Globe Industries, with production due to start in March, 1955. No price yet.

Lower production schedules have brought lay-offs to workers in Curtiss-Wright's propeller division. Close to 500 were furloughed recently, bringing the total since last fall to 1000. . . . Last two commercial Convair 340's are due off the final assembly line next month. Total produced: 206. . . . Avco Manufacturing Corp. has set up a new Defense and Industrial Sales organization. Defense backlog stands at \$180 million. . . . Tours through Central and South America are currently being made by representatives of Beech and Cessna, with a Cessna Model 310, Beech Bonanza, and Twin-Bonanza.

Aviation and Rocket Awards Announced

Outstanding achievements in aviation and rocketry have been highlighted recently by the presentation of a series of awards:

• **Collier Trophy** for 1953 to J. H. Kindelberger and Edward H. Heinemann for their parts in the development of the first supersonic fighter planes in service: the North American F-100 and the Douglas F4D, respectively.

• **Wright Brothers Memorial Trophy** for 1954 to Dr. Theodore Von Karman for a series of accomplishments during the past 20 years. Von Karman, a scientist, engineer, and teacher, is chairman of the USAF's Scientific Advisory Board.

The American Rocket Society presented five awards at its Honors Night dinner early this month:

• **Astronautics Award** to Dr. Theodore Von Karman.

• **James H. Wyld Memorial Award** to Milton Rosen, Office of Naval Research, for Viking rocket research.

• **Robert H. Goddard Memorial Award** to A. M. O. Smith, Douglas Aircraft Co., for his work on liquid rocket propellants.

• **C. N. Hickman Award** to H. W. Ritchey, Thiokol Chemical Corp., for development of solid propellant rockets and boosters.

• **G. Edward Pendray Award** to Martin Summerfield, Princeton University, for literary contributions to rocketry and jet propulsion.

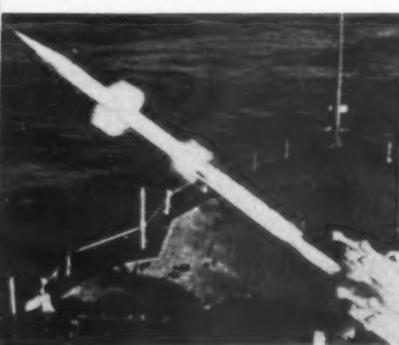
North American Licensee Sought For HD 32

Avions Hurel-Dubois is looking for a U. S. or Canadian licensee for its HD 32 "DC-3 replacement," officials of the company told AMERICAN AVIATION in Washington. The license fee would be either nominal or nothing at all, E. J. Escande, general sales manager of the French company stated.

Hurel-Dubois plans to set up a small company in the U. S. to handle sales and act as an intermediary in finding a North American licensee.

Escande was accompanied by M. Hurel, designer of the high-aspect-ratio-wing aircraft and senior executive of the company. Hurel stated that the first stretched-fuselage HD 32 will fly in February and the Dart-powered HD 70 should be flying in 1956.

The two French executives said that the current price of the HD 32 is \$450,000.



TERRIER IN ACTION

The Navy Terrier, surface-to-air missile, is shown below being launched from the USS Mississippi. At left is the destruction of its target, a drone plane.

BUSINESS

U. S. Procurement Policy Stabilizes Industry, Says Courtland S. Gross

The government's aircraft procurement policy today means greater security for the taxpayer and greater employment stability for the industry, Courtlandt S. Gross, executive vice president of Lockheed, has declared. The current policy, said Gross, is to award contracts only after an airplane has been thoroughly tested, instead of doling out small contracts for experimental models.

What this and other procurement policies mean to the industry in terms of dollars has been summed up in two sets of recently released figures: during the first quarter of this fiscal year the Defense Department obligated over \$900 million for aircraft, and spent over \$1.8 billion. Spending for aircraft under the Mutual Defense Assistance Program totaled close to \$2 million during September alone. For fiscal 1956 the USAF will request between \$15 and \$16 billion in new money, according to USAF Secretary Harold Talbot.

Having obtained their share of these sums of money, the aircraft companies are faced with the problem of holding on to it. One drain on their revenues, a tax imposed by Los Angeles County, is about to be fought in court. Test cases will be brought by Convair and Aerojet-General Corp., and for the next two years the fight will be carried upward toward the Supreme Court, if necessary. The county has, for the past two years, been taxing materials, inventory, and work-in-process which has been on the premises of the aircraft companies, although the companies maintain that such property had already passed into possession of the federal government. The two firms were chosen for the test cases by the Defense Department.

Elsewhere on the business scene:

- U. S. Navy, during the first four months of the fiscal year, obligated almost \$48.8 million for guided missiles.

- North American Aviation has received a USAF order for a third version of the Super Sabre, the F-100D, reportedly a fighter-bomber like the "C".

- Ryan Aeronautical Co. subcontract for the aft fuselage and torque box on the Boeing 707 (KC-135) is for \$3 million, and may grow considerably. The firm has built 675 aft fuselages for the Boeing C-97 and KC-97 during the last five years.

- Hamilton Standard Div., United Aircraft, has an order from the Navy for \$2.24 million worth of propeller assemblies.

- Ramo-Wooldridge Corp. will build airborne computers under a \$1 million program sponsored by Westinghouse Electric Corp. Both companies will use the computers.

- Link Aviation will build a prototype simulator of the Cessna T-37A twin-jet trainer under USAF contract.

- Capital Airlines solicited bids early this month for turboprop fuel supply for its coming Vickers Viscounts. Several major oil companies were understood to be competing, some with hopes of providing better products than were called for in the request for bids.

- Allison Div., General Motors, has hopes that its cancelled order for J71-A-2 turbojets, originally destined for McDonnell F3H Demons, will be restored, at least in part. Remaining orders for that model extend through May.



RECORD CONTRACT, calling for delivery of 55 million gallons of gasoline during the next three years, is signed by A. C. Stewart, right, marketing vice president for Union Oil Company of California, and Stanley R. Shatto, operations vice president Western Air Lines.

PROFIT & LOSS

- Garrett Corp. backlog stands at \$102 million, up from the \$96 million held six months ago.

- Grumman Aircraft Engineering Co. nine-month net (as of Sept. 30) was \$7.2 million, or \$3.59 a share, on sales and other income of \$155.6 million. For entire calendar year 1953 Grumman's net was only \$7.1 million on sales of \$240.9 million.

- Solar Aircraft Co. six month net (as of Oct. 31) is reported as \$411,600 on sales of \$31.5 million. First half of

1953 brought a net of \$931,300 on sales of \$35.4 million. Drop is attributed to expense of moving to new plant and tooling for new products.

- Northeast Airlines reports third quarter earnings of \$354,000 on operating revenues of \$3.3 million, with \$138,400 set aside for taxes. Previous year figures were: \$257,000 on \$2.9 million with \$265,000 set aside. The latest results offset earlier losses to bring nine-month figures to a net of \$174,000 on \$7.2 million. In 1953 NEA had reported a net of \$291,000 on \$6.6 million for the period.

- McDonnell Aircraft Corp. reports a net for the quarter ending Sept. 30 of \$825,000 on sales of \$27.5 million. During the comparable period last year the firm netted \$1.1 million on \$36.6 million.

DIVIDENDS

- Bendix Aviation Corp. will pay a quarterly dividend of 75¢ plus a special \$1 dividend on Dec. 27. Payments for 1954 will total \$4 per share, vs. last year's \$3 plus 7% in stock.

- Capital Airlines has declared a 5% common stock dividend payable Dec. 21. There are 791,838 common shares outstanding. Only previous dividend, 25¢ per share, was declared in 1945.

- The Garrett Corp. will pay a 40¢ quarterly dividend on Dec. 31.

- Curtiss-Wright Corp. will pay a quarterly 25¢ common dividend on Dec. 23, bringing the 1954 total to \$1 per common share. Quarterly dividend of 50¢ on Class A stock will be paid at the same time.

- North American Aviation will pay a total of \$1.25 per share on Jan. 6.

- Temco Aircraft Corp. will pay a quarterly dividend of 15¢ plus a similar special cash payment on common stock Jan. 15.

FACILITIES

- Bendix Aviation Corp. will build several testing laboratories on a 10-acre site at Palmdale, Calif., close to the airport.

- Northrop Aircraft is preparing to move top level executive offices into a separate building at its Hawthorne, Calif., plant. The building had originally been built for the Northrop Aeronautical Institute, since sold.

- Airwork Corp. has opened a branch at Newark Airport to serve New York and New England.

- Radioplane Co. (subsidiary of Northrop) is due to move its weapons systems division this month into a new engineering and research building in Van Nuys, Calif.



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PULSE OF THE INDUSTRY

Traffic, Revenues, and Expenses of U. S. Carriers—1953-54

MOST CLASSES of U. S. domestic trunk airline traffic showed satisfactory growth in 1954, but operating income was \$7 million less than in 1953 as expenses continued to outgain revenues, according to year-end estimates of the Air Transport Association.

On the other hand, local service lines and U. S. international carriers showed substantial improvement in operating income, with revenues outpacing expenses.

Combined revenues of trunk, local service, and international lines reached \$1,378,089,000, compared to 1953's \$1,265,437,000. Of the 1954 total revenue, 82.8% was from passenger traffic (89.1% for domestic trunk).

Domestic revenue of \$965,300,000 was up 9.84% over 1953, while expenses of \$885,000,000 gained 11.82%. Operating income was \$80.3 million against \$87,377,000 in 1953. A sharp increase in depreciation charges as new equipment was added was a factor in the expense rise.

After a slow start in the first quarter, domestic traffic ended the year with an 11.55% gain in passenger-miles, a figure that would have been higher except for American Airlines' pilot strike. Revenue passengers increased 10.46%, mail ton-miles 13.35%, freight ton-miles 7.76%. Downward trend in air express resulted in an 8.88% drop in ton-miles and a 13.8% decline in revenue. Biggest revenue gain was in passenger traffic, up 10.96%. Total revenue ton-miles increased 10.72%.

Local lines' operating income jumped from a red figure of \$1,545,000 in 1953 to a black figure of \$600,000 this year. Revenues rose 9.4%, expenses increased only 4.91%. The locals continued their substantial gains in passengers carried (up 20.6%) and passenger-miles (up 15.9%). Total revenue ton-miles gained 17.81%.

International lines increased operating income from \$19,379,000 in 1953 to \$29,789,000 in 1954. Expenses rose only 3.49% against a 6.38% gain in revenues. Increase in passengers carried was 4.84%, passenger-miles 9.43%. Biggest improvement was in U. S. mail ton-miles, up 37.32%. Total revenue ton-miles gained 11.34%.

TRAFFIC	DOMESTIC TRUNKS		
	1953	1954	% Change
Revenue Passengers	26,135,794	28,869,000	+10.46
Revenue Pass. Miles (000)	14,297,909	15,950,000	+11.55
Mail Ton-Miles	71,725,595	81,300,000	+13.35
Express Ton-Miles	42,526,761	38,750,000	-8.88
Freight Ton-Miles	131,779,675	142,000,000	+7.76
Total Revenue Ton-Miles	1,637,493,191	1,813,000,000	+10.72

REVENUES AND EXPENSES (\$)			
Passenger Revenues	775,782,000	860,800,000	+10.96
Mail Revenues (including subsidy)	36,453,000	39,500,000	+8.3
Express Revenues	16,830,000	14,500,000	-13.84
Freight Revenues	29,341,000	31,716,000	+8.09
Total Revenue	878,793,000	965,300,000	+9.84
Total Operating Expenses	791,416,000	885,000,000	+11.82

TRAFFIC	LOCAL CARRIERS		
	1953	1954	% Change
Revenue Passengers	2,031,508	2,450,000	+20.60
Revenue Passenger-Miles	390,854,000	453,000,000	+15.90
Mail Ton-Miles	1,000,758	1,220,000	+21.91
Express Ton-Miles	955,128	1,100,000	+15.17
Freight Ton-Miles	1,178,793	1,175,000	-0.32
Total Ton-Miles	40,744,868	48,000,000	+17.81

REVENUES AND EXPENSES (\$)			
Passenger Revenues	23,306,000	26,900,000	+15.42
Mail (including subsidy)	24,356,000	26,000,000	+6.75
Express	463,000	500,000	+7.99
Freight	462,000	475,000	+2.81
Other Revenues	771,000	125,000	...
Totals	49,358,000	54,000,000	+9.40
Expenses	50,903,000	53,400,000	+4.91

TRAFFIC	INTERNATIONAL FLAG CARRIERS		
	1953	1954	% Change
Revenue Passengers	2,682,219	2,812,000	+4.84
Revenue Passenger Miles (000)	3,381,124	3,700,000	+9.43
U. S. Mail Ton Miles	24,467,569	33,600,000	+37.32
Foreign Mail	6,370,804	7,233,000	+13.53
Cargo Ton-Miles	74,643,683	82,300,000	+10.26
Excess Baggage	8,209,270	8,950,000	+9.02
Non-scheduled Revenue Ton-Miles	7,699,689	10,000,000	+29.88
Total Revenue Ton-Miles	466,774,043	519,680,000	+11.34

REVENUES AND EXPENSES (\$)			
Passenger Revenues	232,539,000	253,105,000	+8.84
U. S. Mail Revenues (including subsidy)	53,747,000	56,173,000	+4.51
Foreign Mail Revenues	9,556,000	9,400,000	-1.63
Cargo Revenues	27,331,000	29,531,000	+8.05
Excess Baggage Revenues	5,245,000	5,720,000	+9.06
Non-Scheduled Revenues	3,340,000	4,500,000	+34.73
Total Operating Revenues	337,286,000	358,789,000	+6.38
Total Operating Expenses	317,907,000	329,000,000	+3.49

Sources: For 1953 from CAB recurrent reports. For 1954 monthly traffic reports for 10 months. For revenues and expenses, reports for the first three quarters of 1954—last quarter estimated.



FIRST FOR COPTERS. World's first military airport for helicopters was dedicated this month by the Army at Fort Eustis, Va. Crossed runways, 600-ft. long, will be used when heavy loads or atmospheric conditions dictate short take-off and landing runs.

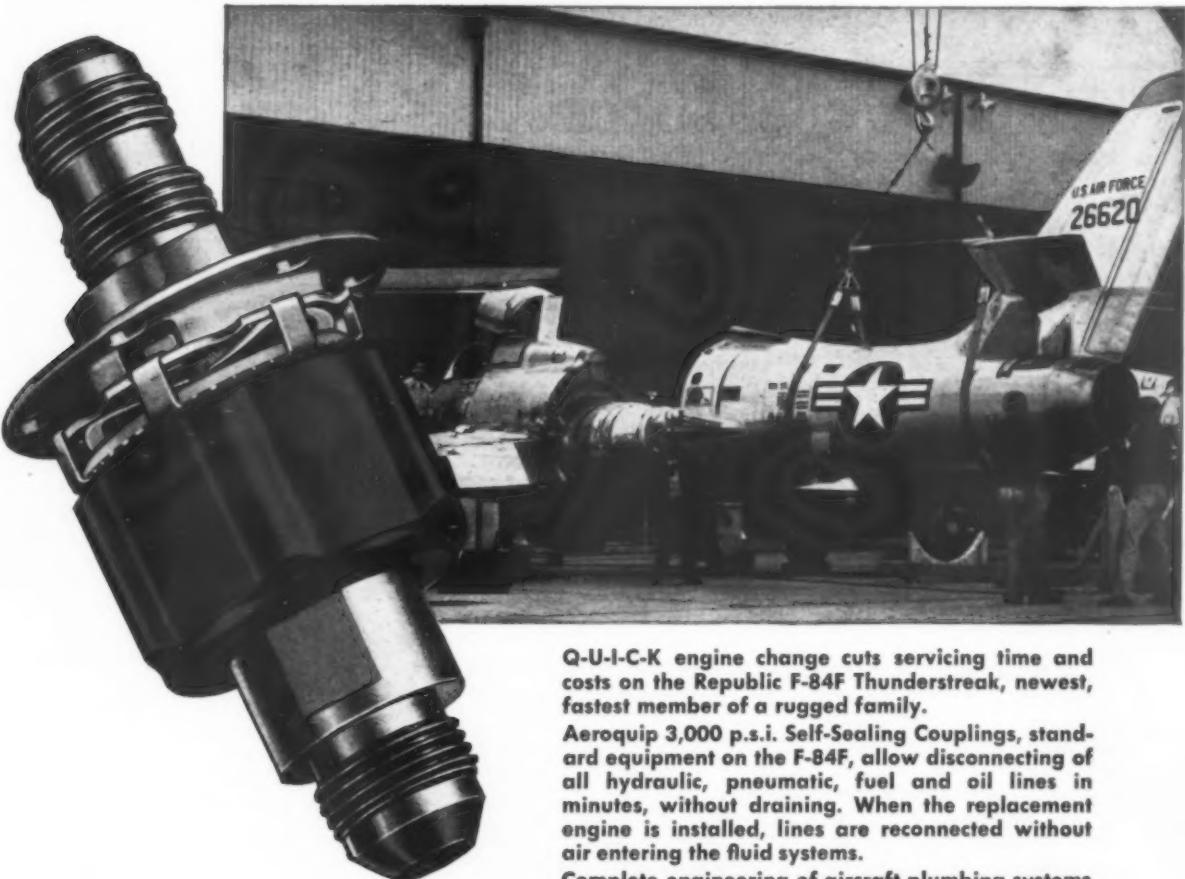
Wilson Says Spending Is Near Lowest Limit

Defense spending lower limit will be between \$33 and \$37 billion, Defense Secretary Wilson said recently, noting that "if world conditions do not change, we are getting close to the bottom." Defense expenditures this fiscal year are expected to run more than \$35 billion.

Noting that the current defense research and development effort is at "a pretty high level," Wilson said he expects to devote more time to R&D matters, but has no thought of reducing or expanding the overall R&D program at this stage.

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29

L. L. Schroeder vs. Commerce Department:

FEDERAL AID TO WHICH AIRPORTS?

WHOMO SHALL DECIDE the basis of federal aid to airports?

The Department of Commerce and CAA thought they had the question settled earlier this year when, after congressional hearings, they allocated available money on a formula of need and national priority.

They reckoned without L. L. Schroeder, commissioner of aeronautics for the state of Minnesota.

Judging by the volume of correspondence, Schroeder has spent a major portion of his time of late finding fault with the formula as applied to Minnesota. Significantly, highest priority airports for federal funds under the Commerce formula proved to be two fields under jurisdiction of the Minneapolis-St. Paul Metropolitan Airports Commission. Schroeder has feuded with the commission for years.

Projects refused federal aid, again on the basis of the national formula, happened to be located outside the area of commission jurisdiction.

Under Minnesota law, all projects must have Schroeder's approval before submission to CAA. Apparently the state commissioner grossly overestimated the amount of money that might be available to Minnesota and assumed his requests for out-state projects would be met in addition to two submitted by

the Metropolitan Airports Commission and which he approved before passing on to CAA.

In any event, all of his requests were not met. The result has been a flood of Schroeder correspondence, aimed at flushing a covey of government officials, ranging in rank from Secretary of Commerce Weeks down to CAA district airport engineers, into reversing themselves. Actually, Schroeder has succeeded only in arousing their anger. The Under Secretary of Commerce, Robert B. Murray, CAA Administrator Fred B. Lee, and others patiently explained to the Minnesota commissioner how they arrived at their formula, but to no avail.

Knowing that it would be faced with many more requests in fiscal 1955 than it had funds to match, CAA set up a priority system by which to allocate available money. In essence, this priority system established the amount of airport activity and type of project as the basis for giving out funds. Amount of activity at an airport was determined from the number of enplaned passengers and/or the number of aircraft based on the field. On type of project, highest priority was given to land acquisition for the so-called Doolittle clear approach zone to runways.

"As a matter of policy," declared Murray, "we're not going to fritter away small amounts of money on small projects."

CAA found itself with project requests totaling \$55 million and only about \$15 million with which to meet them, plus a discretionary fund of \$5 million and \$1.5 million left over from previous years.

On August 12 Schroeder sent in requests for seven Minnesota projects totaling \$1,627,035, and said in the final paragraph of transmittal: "Of the airport projects identified herein, the state recommends that priority be given to the projects in the order listed, except, however, that the first four projects are to be regarded as having equal priority."

Equal priority was not the basis of Commerce's allocation of funds, so it proceeded with its formula of national interest with the result that the entire

amount of the state apportionment from CAA's \$15 million fund—\$357,395—was allocated to Wold-Chamberlain, terminal airport for Minneapolis-St. Paul. However, this did not meet the total request for Wold-Chamberlain, which came to an additional \$131,305. So, when the \$5 million discretionary fund was dipped into, Wold-Chamberlain still had a high enough priority to get the \$131,305 and likewise, Crystal airport, a Twin Cities secondary field on which 162 aircraft were based, had a high enough priority to receive \$30,000 from discretionary funds for approach protection.

The remainder of the requested work on Crystal, amounting to about \$49,000, was not approved, nor were Schroeder's proposed improvements at Eveleth-Virginia, Grand Rapids, and Rochester because of a lack of money for projects of their lower priority. Eveleth-Virginia and Grand Rapids had little traffic and few based aircraft; in the case of Rochester, future of the present airport was in doubt.

Schroeder then asked for a hearing on his projects, and got it before Fred B. Lee, CAA Administrator. The Minnesota appeal was one of seven made to Commerce as a result of its allocation of airport and discretionary funds for fiscal 1955. Of the seven appeals, four were denied because they brought to light no information not previously taken into account by CAA; three were granted on the basis of new information. Schroeder's appeal was one of the four turned down.

Having failed by this method, Schroeder took to a letter writing campaign that has included all of the people directly concerned in the Department of Commerce, Minnesota senators, and the Hoover Commission. As Schroeder's letters have grown longer, replies to them have become shorter and sharper.

Schroeder's longest letter to date, running through eight pages, has drawn the shortest reply. In it, Schroeder seeks to discredit the Wold-Chamberlain project, apparently in an effort to keep federal funds from it if none are forthcoming for his own out-state projects on whatever basis.

CAA and Commerce officials are non-plussed by this amazing shift in attitude, since the Wold-Chamberlain project was submitted with Schroeder's explicit approval. They point out that his objections to it are matters that Schroeder should have raised earlier if he really takes them seriously.

"Schroeder has had every bit of service from the Department of Commerce he could have the remotest desire for," said Murray last week. Even so, government aviation officials in Washington are expecting more complaining letters, signed "L. L. Schroeder."



Commissioner Schroeder displays watch presented to him as president of the National Association of State Aviation Officials.



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ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921

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Exclusive Interview

with

HERBERT SAMMONS

Managing Director, D. Napier & Son, Ltd.

British Turboprop Engines For U. S. Aircraft

MAN ON THE COVER

Herbert Sammons, managing director of D. Napier & Son Ltd., was born in Coventry, England's engineering center, in 1896. After service with the British Army in World War I he held appointments with Archdale & Son and Petters Ltd. He became chief designer and later chief engineer of the latter company.

In 1934 he joined Sir Armstrong Whitworth (Engineers) Ltd. where he remained until 1943 when he joined the Napier company as chief engineer. He became Napier's managing director in 1949.

Sammons was closely associated with the development of the Napier Sabre piston engine, and after World War II was responsible for the design and development of the Nomad compound diesel, Eland turboprop, Oryx gas generator, and Deltic marine diesel engine.

Q. What is your program for the Convair 340 that you are fitting with Eland engines?

A. We have a full program. The aircraft arrived in England late in November. We hope to have it flying with Elands by July next year. From then until spring of 1956 we will be obtaining our own flight experience and qualifying for a British certificate of airworthiness. It is our intention at that stage to fly the aircraft back to the United States for demonstration and certification purposes.

Q. Did you find any aircraft other than the Convair 340 that might be suitable for re-engining with the Eland—the DC-7 or the Super Constellation perhaps?

A. We are not limiting our investigations to any particular type of aircraft. We intend to sell our engines in the widest possible market, and aircraft requiring engines in the Eland's power bracket are of interest to us. To make it clear, we are far from concentrating on the re-engining of existing types, as we are confident that the Eland has a bigger future in new aircraft. We have bought the Convair 340 to show we mean business, to help to accumulate flying hours rapidly, and to demonstrate the case for re-engining as well.

Q. What is your Eland production schedule?

A. Engines off the production line at the first rating of 3250 ehp (as distinct from engines for prototype aircraft) will become available for operation early in 1956, and at the second rating of 4200 ehp in 1957.

Q. Can you give any figures on the overhaul life of the Eland in commercial service?

A. I won't risk what they will allow initially, but our aim is to get a minimum of 1000 hours on the hot end of the engine with a longer life on the cold side. We have designed the engine so that you can take the turbine off and replace it with another very easily.

Q. Would you trace briefly the background of the Napier company?

A. The Napier company was founded in 1808. The turning point in its history came in 1898 when the first Napier motor car engine was produced. For the next quarter of a century Napier was among the pioneers of the motor industry and the world's land speed record is still held by John Cobb's Napier-Railton car which in 1947 achieved a speed of 394.2 mph with two special Napier engines.

It was during the 1914-18 war that the company first turned to the manufacture of aero engines. Between then and the last war such well-known engines as the Lion, the Rapier, and the Sabre emerged from its works.

In 1941 Napier became part of the famous English Electric group with its world-wide ramifications and interests. Marconi's also belongs to the group, which thus covers every aspect of modern aeronautical endeavor—airframes, engines, guided missiles, radio, and electronics.

Q. What are the current areas of activity at Napier?

A. Our aviation activities include the following: Eland turboprop 3000/4200 eshp; Oryx helicopter gas generator 750/1000 ghp; Eland helicopter 'special form' turboprop 3000/4200 eshp (for Fairey Rotodyne); Nomad com-

'... no justification for the two-spool engine.'

pound diesel engine 3000/4500 eshp; rocket motors for guided missiles; Napier patented de-icing system; manufacture of the Roll-Royce Avon engine for the English Electric Co.'s Canberra aircraft.

We continue to produce the Deltic diesel engines for marine and other surface carriers as well as a variety of turbo superchargers for all kinds of diesel engines.

Q. Do you feel that the turboprop is the ideal helicopter powerplant?

A. As the gas turbine has revolutionized fixed wing aircraft, so it will also revolutionize rotary wing aircraft. There are several possible means of helicopter propulsion using turbine engines and each has its own special merits. This sphere of the aircraft industry is very much in its infancy and it would be unwise for anyone to state categorically which particular form of gas turbine propulsion is the ideal.

The turboprop engine, when used for mechanically driving the helicopter rotor, is far superior to any other kind of engine. Its lower installed weight shows to great advantage over the piston engine, permitting an increase in pay-load and/or range. It also simplifies the mechanical transmission between the engine and rotor.

Other forms of helicopters are made possible by using the turbine as a gas generator and by elimination of all mechanical transmission between engine and rotor. Gas delivered from the engine to the rotor tips emerges in jet form. Napier has taken the lead in developing gas turbines specially designed to meet helicopter requirements.

Q. Do you think that licensed production of aircraft engines should be assigned to companies in non-aviation fields when manufacturers in aviation have space available for this purpose?

A. The gas turbine engine depends for its success on high performance at low weight with adequate strength. This implies manufacturing to close tolerances, often employing special techniques and machine tools. It generally requires experienced men under expert supervision. The sum total of these factors is experience and it follows that licensed production should, when possible, be assigned to those already experienced in the aviation field.

Q. How long does it take to get a modern jet engine from the design to the production stage?

A. It is most unlikely that the period would ever be shorter than five years for a relatively new type. From inception of design to certificate of airworthiness the period is more likely to be six years and upwards. This largely depends upon the number of engines and test beds available for development.

Q. Are you planning on the use of titanium in your engines and what are the advantages and disadvantages of titanium to the engine manufacturer?

A. We are working on titanium but the advantages to be obtained in weight saving on small- and medium-powered engines such as Napier is developing at the present time are not sufficient to justify the extra expense. However, to obtain the same specific weight on engines of 10,000 lbs. thrust and upwards, the use of titanium is essential.

Q. What are your views on the single- versus twin-spool controversy, particularly as it applies to turboprop engines?

A. Fundamentally there is no justification for the complicated two-spool turboprop engine. It has only been adopted by certain engine manufacturers on account of their inability to obtain high pressure ratios with high efficiencies and suitable surge line characteristics on a single axial compressor. Extensive research done by Napier on axial compressors has enabled it to have a sufficiently high-pressure ratio engine on a single spool and still obtain as much overall flexibility of operation as is possible with the twin-spool engine.

The increased complexity of the two-spool turboprop arrangement and the consequent complexity of the control system must inevitably lead to longer development times and greater problems in maintenance and servicing. It is also doubtful whether, due to limitations of compressor characteristics and control problems, the full flexibility claimed for two-spool engines will be achieved.

Q. Some engineers feel that the turboprop will not come into its own economically until they get to approximately 10-12,000 hp and are used on transports of comparable size. Is this justified?

A. We do not subscribe to this opinion and we consider that there is a large field for the turboprop engine both on fixed and rotary wing aircraft in powers from 750 hp and upwards. We consider that this has already been demonstrated in practice.

Q. Do you see any real need for the so-called supercharged turboprop?

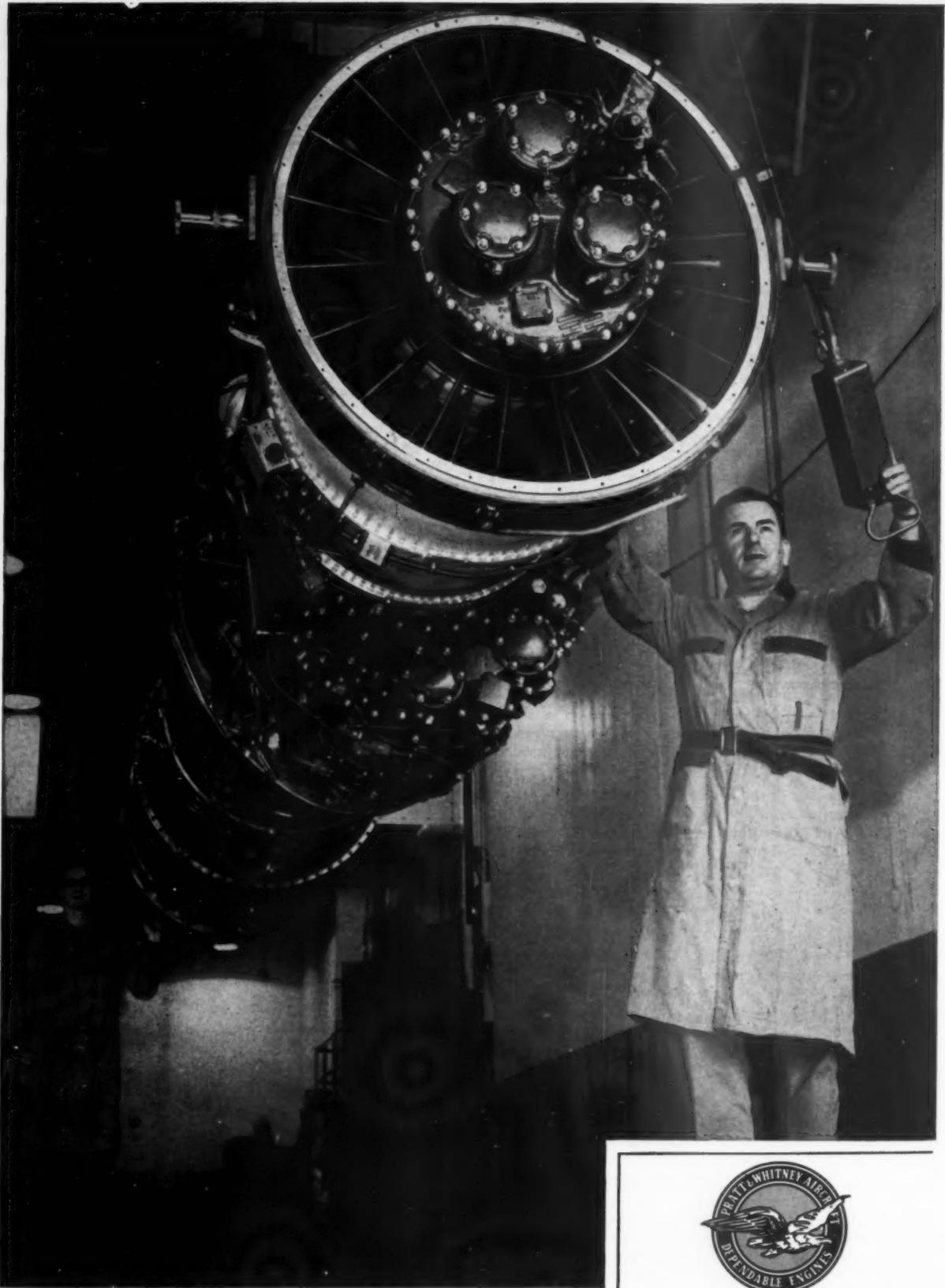
A. This is an example of the latest cult of coining technical jargon to confuse everyone including the technical expert. If you mean a two-spool engine which is de-rated in power at low altitudes, then this is one method of meeting the power requirements of fast aircraft. For such aircraft the altitude power is a high percentage of the sea level power and to meet the requirements it is necessary, in effect, to design an oversize engine at sea level and then de-rate it. The engine is then stressed for the lower sea level power and some weight thereby saved.

The de-rating can, of course, be carried out just as effectively on engines other than the so-called supercharged turboprop.

Q. What is the functional relationship between sea level horsepower of a supercharged turboprop, i.e., what horsepower would a 4000 eshp supercharged turboprop have at sea level if it were not mechanically limited in sea level power?

A. The relationship between de-rated power and nominal power is quite arbitrary and depends upon the altitude below which de-rating is effected. The higher the altitude the bigger the differences in the two powers. In practice, the ratio would depend on the speed of the aircraft and the consequent cruising power requirements relative to take-off power requirements. A reasonable ratio would be a little less than 1:2.

Continued on page 36



One 10,000-lb. thrust class Pratt & Whitney Aircraft J-57, equipped with afterburner for combat ratings of tremendous additional power, is the heart of the Super Sabre's supersonic performance.



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Sharply swept-back wings and tail surfaces mark the North American F-100 Super Sabre. Built around one Pratt & Whitney Aircraft J-57 turbojet and afterburner, the Super Sabre is the Air Force's first operational supersonic jet fighter.

Super Sabre Has Supersonic Performance

Sustained level flight above Mach 1 is a vital attribute of the latest U. S. fighting aircraft, and North American's F-100 Super Sabre has it.

Such hard-won capability—possessed by only a few production aircraft—is the product of highly advanced airframe design wedded to a flexible, efficient turbojet engine of enormous power.

The sleek Super Sabre is now being built in quantity for the U.S. Air Force. Equipped with the

Pratt & Whitney Aircraft J-57 turbojet and afterburner, it has already set the world's speed record of 755.149 miles per hour—an enviable beginning for a fighter on which so much depends.

In the Super Sabre, as well as in other supersonic fighters and high-speed jet bombers, performance of the Pratt & Whitney Aircraft J-57 turbojet is fully justifying the long years and intensive effort required for its development and production.

Pratt & Whitney Aircraft

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'... free turbine problems outweigh advantages.'

Q. How far into the future will we have to look to expect specific fuel consumption of the turboprop engine comparable to piston engines at 25,000 feet cruising altitudes, say .44 lb/ehp-hr?

A. This depends to a certain extent on the aircraft speeds envisaged, the higher the forward speed the better the specific consumption. It is probable that turboprops giving a .44 lb/ehp-hr at say 400 mph and 25,000 feet under cruising conditions will not be available for regular service until the end of this decade. The same consumption at 30,000 feet might be expected by the end of 1956 in pre-service tests.

Q. Do you see a future for variable stator installations in turboprop-type engines to permit higher compression ratios without use of split compressors?

A. The use of variable stators is one method of improving a compressor surge line and, hence, handling qualities of a single spool compressor engine. The response that can be obtained from them, however, depends entirely on the basic compressor design to which they are applied.

Napier compressor research has resulted in a design technique which not only gives optimum compressor efficiency well removed from surge but also a very marked reduction in capacity at part load by the use of variable inlet guide vanes. Thus, the maximum power point can be set away from surge without loss of efficiency and the VIGV insure excellent part load handling qualities.

Recent research has shown very high pressure ratios in a single spool compressor still retaining the above qualities. We are in no doubt therefore of our ability to produce a high-compression-ratio single-spool engine with good handling qualities.

Q. What is your view on safety to minimize the effect of high drag on turboprops in event of an engine failure before prop feathering takes place or in the event it fails to feather?

A. In all matters of safety, Napier considers it desirable if not essential to have a control and safety system such that protection is still given in event of failure of the primary safety device.

In event of a propeller governor failure, for instance, automatic pitch coarsening would be set in motion by a signal from the torquemeter. Should the torquemeter signal fail, then excessive windmilling drag would be prevented by a pitch stop at the take-off setting. The propellers to be supplied with the Eland, in Britain at least, are fitted with an overspeed propeller governor and also a multi-position mechanical pitch lock which operates on loss of engine propeller oil.

As no safety device will be literally 100 percent perfect, each should be backed up by one or more additional safety devices.

Q. Some airline engineers have urged that this country take another look at the free-turbine type of turboprop. Would you give us your ideas on the advantages of the free turbine vs. the more conventional arrangement? What safeguards might be taken to eliminate the apparent hazards of free turbine installations?

A. The main advantages of the free turbine over the fixed are: less power required for starting; a wider choice of power operation over the rpm range, allowing lower propeller rpm for cruising; and consequently less noise from the propeller.

The difficulty of controlling the free turbine in case of reduction gear failure, in our opinion, outweighs the above advantages. If the safety device used to protect this possibility fails, then a catastrophic failure results.

Q. What weight per horsepower can we look forward to in large turboprop engines?

A. For powers up to 5000 ehp it is unlikely that a reliable engine could be produced in the near future for much less than .4 lb/hp. Engines may well be available in the next two or three years with a specific weight of .43 lb/hp.

Q. Are propellers going to be ready for truly advanced turboprop engines. Will propeller efficiency be a major factor in turboprop developments?

A. Judging from the previous questions, advanced turboprops means those of 10,000 hp upwards. If aircraft firms will accept larger diameters, then it is possible that suitable subsonic propellers will be available. If no increase in propeller size is permissible, then propeller efficiency would be a major factor unless the complication and weight of contra-rotating subsonic propellers are accepted.

Alternatively, supersonic propellers provide an answer, but it is doubtful whether they would be acceptable for civil aviation in view of the noise factor.

Q. Is the ducted-fan engine apt to reduce or eliminate the need for turboprop engines?

A. No. There is only a case for the ducted-fan engine over a very narrow flight speed band.

Q. Do you feel that conversion of existing aircraft to turboprop engines is technically feasible? It is economically feasible or likely?

A. It is technically feasible to convert existing types of modern aircraft to turboprop flight, e.g. Convair 340 and the Ambassador.

Conversion is economically feasible, and indeed desirable, when it enables an airline to look forward to a renewed period of useful life in its fleet, and/or when it sees, in conversion, a means of meeting turboprop competition without a wholesale fleet renewal.

Many operators are eagerly awaiting the day when a suitable turboprop engine is available to them.

Q. What is the present status of the Nomad, your compound diesel. What are the prospects for getting any real applications for the engine?

A. Well, we obviously think they are real. We are not unconscious that it is a unique design, that there is no one else more able to do the same type of powerplant. It has such extraordinary economy that we feel that from both the military and civil point of view, particularly for long-range freighting, that engine will have a field of application. It is achieving .325 fuel consumption and by development we will get down to .3 lbs/ehp/hr.

CAPITAL UPS ITS ORDER TO 60 VISCOUNTS

BY ANTHONY VANDYK



Trans-Canada's first Viscount has arrived.

AN INCREASE in Capital Airlines' order from 40 to 60 planes and the arrival in Montreal of Trans-Canada Air Lines' first aircraft made the Vickers Viscount live up to its reputation as a headline-maker early this month.

By exercising its option to buy an additional 20 of the turboprop transports, Capital has now committed itself to buy \$67 million worth of British equipment. All financing arrangements have been completed and deliveries will start in March 1955 and continue through February 1957.

Capital will have three Viscounts to start its scheduled services in April, and 40 will have been delivered by August 1956.

TCA is starting its scheduled services with Viscount in February. To keep Capital and TCA in spare parts, Vickers-Armstrongs Ltd. and Rolls-Royce of Canada Ltd. have set up elaborate programs. Vickers has established a store within Capital's warehouse in Alexandria, Va., which will stock everything from wings and landing gears to nuts and bolts. Currently the Vickers store occupies about 6400 square feet of space, but by February it will have been expanded to 14,000 square feet.

The Vickers store will be stocked for Capital's 40-aircraft fleet even though the airline will be operating only three Viscounts until the latter part of 1955. The stocking of the store is being based on experience in meeting the requirement of European Viscount operators. Since the store is not bonded, Vickers will pay U.S. customs duty on all items it imports. Later a repair facility may be added to the store but initially it will merely issue spares. It will not accept items needing repair in exchange for serviceable items (it will, however, take back items returned under warranty). The Alexandria store will be open on a 24-hour basis and should contain everything that Capital would require. In an emergency, however, spares could be obtained from England in little

over 48 hours. The Alexandria store will be run by W. J. Young, Vickers supply superintendent in Washington, with two British assistants and three or four locally hired storekeepers.

Although the Alexandria store will contain all airframe items and accessories, it will not provide engine spares. These will be available from the Rolls-Royce of Canada stock in Montreal. The Canadian store will be bonded so that items imported from England for Capital will not have to pay double duty—Canadian and U.S. Rolls-Royce is providing Capital with a stock of spares sufficient for a month's reserve, while the Montreal store will have a four to six months' reserve to meet the Capital and TCA requirements.

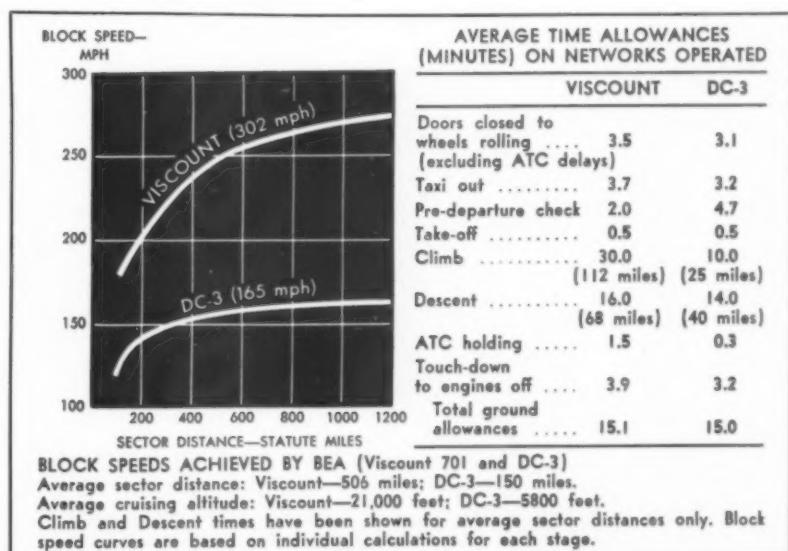
Rolls-Royce has named Bruce Thompson as resident engineer with Capital Airlines and will put service engineers at whichever airports the airline desires. Vickers has appointed R. H. Botterill as its technical representative with Capital and E. J. Cockell as its senior field service engineer with the air-

line. At least six service engineers from Vickers will be located at outstations, and additional British specialists will be attached to Capital's headquarters in Washington.

Meanwhile key technical personnel from Capital completed a six-week course at Vickers' Weybridge plant last month and are now starting to train other members of the airline's staff.

Both Capital and TCA are leaning heavily on British European Airways' experience in operating Viscounts. The British airline recently made public full information on its turboprop aircraft operations, which were started on April 16, 1953. The immediate effect of introducing Viscounts on BEA routes was a big build-up in traffic. On services to Switzerland, traffic went up by 68%; to Scandinavia the increase was 58%; to Spain and Portugal, 49%; to the Mediterranean, 41%. By March 31, 1954, the end of the BEA fiscal year, 20 Viscounts were in BEA service and 15,400 revenue hours had been flown.

During the year the Viscount



earned some \$9 million in revenue in providing 16,376 capacity ton-miles and achieving a load factor of 70%. Total costs, including all allocated overheads, amounted to \$7,985,600 so that, over the year, the average fleet of 12 Viscounts made a profit of \$842,800 at a rate of \$548.80 profit for each revenue hour flown. These aircraft provided 19.6% of BEA's total output of capacity ton-miles during the year. The profits were achieved on BEA's longer high-density routes (the average sector distance flown was 506 miles and the average fare paid was \$487.20). The Viscount was also on some short routes.

Air France is now getting 6½ hours daily utilization out of its Viscounts, Raymond Dupre, vice president of the carrier's technical directorate, told AMERICAN AVIATION recently. He said that the turboprop transports in October achieved better regularity than any other type of aircraft in the Air France fleet. Early next year the Air France shops at Courbevoie will overhaul the Vis-



Accessibility of the Viscount's Darts is an important feature.

counts' Dart engines. At the moment Rolls-Royce overhauls the engines of both BEA and Air France. Capital will

overhaul its Darts in Washington while TCA will do its own overhauls in Winnipeg.

• • •

HOW BEA COMPARES VISCOUNT AND DC-3 COSTS (For Year Ended March 31, 1954)

BASIC ANNUAL COSTS (per aircraft)	Viscount (\$)	DC-3 (\$)
Fixed costs	56,926.80	13,686.40
Interest on capital sunk in aircraft and spares	26,703.60	2539.60
Engineering overheads	18,547.20	6350.40
Flight training	10,766.00	1738.80
Station administration and fixed charges	29,346.80	14,366.80
General administration and overhead	49,044.80	21,988.40
Sales, publicity, and commission	91,495.60	24,886.40
Total Basic Costs per Aircraft	282,830.80	83,036.80

HOURLY OPERATING COSTS (per revenue flying hour)

	(\$)	(\$)
Flying staff pay, allowances, training, etc.	36.75	25.98
Stewards pay, allowances, etc.	4.95	1.90
Fuel and oil	71.15	24.53
Fuel and oil non- recoverable duty	1.79	9.24
Variable engineering costs	67.87	29.09
Passenger and cargo insurance liability	2.83	0.95
Cabin amenities	1.46	0.42
Meals on aircraft	14.70	1.23
Hourly operating costs	201.51	93.34

LANDING COSTS (per revenue landing)

	(\$)	(\$)
Landing fees	26.54	14.17
Meals and ground accommodation (passengers and crew)	27.10	8.34
Total Landing Costs	201.51	60.00

Aircraft utilization (revenue hours per annum)	1457	1611
Average sector distance (statute miles)	506	168
Cost per revenue flying hour	\$518.84	\$190.96
Cost per aircraft mile	\$2.35	\$1.58
Cost per capacity ton-mile	48.91¢	51.95¢
Cost per seat mile	5.62¢	5.61¢
Number of revenue flights	6606	55,566
Revenue per capacity ton-mile	54.05¢	41.88¢

HOW BEA COMPARES VISCOUNT AND DC-3 OPERATIONS (For Year Ended March 31, 1954)

	Viscount	DC-3
	Passenger Services	Freight Services
Service aircraft— ave. '53-'54 (excluding training, con- version, etc.) ..	10.6	46.5
Traffic revenue earned	\$8,826,843.20	\$10,370,684.80
Operating cost ..	\$7,984,230.80	\$12,611,790.80
Surplus or deficit	+\$842,612.40	-\$2,241,106.00
Total hours flown	17,111	62,837
Revenue hours flown ...	15,836	60,826
Total utilization (hours per air- craft per year).	1457	1589
Revenue air- craft miles ...	3,397,183	7,437,491
Traffic revenue per rev. mile ..	\$2.60	\$1.40
Operating cost per rev. mile ..	\$2.35	\$1.69
Available ton-miles	16,376,286	22,830,237
Revenue ton-miles	11,424,661	14,225,721
Load factor ..	69.8%	62.3%
Break-even load factor ...	63.1%	75.8%
Available ton- miles per service aircraft per year	1,544,933	612,905
Passengers carried	146,454	828,537
Passenger load factor	68.6%	66.1%
Total cost per available seat-mile	5.6¢	5.6¢

THIRSTY THROATS



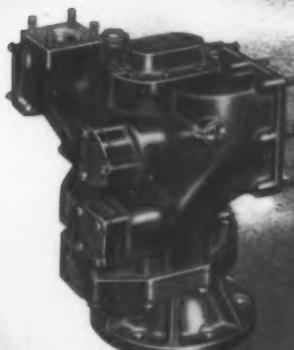
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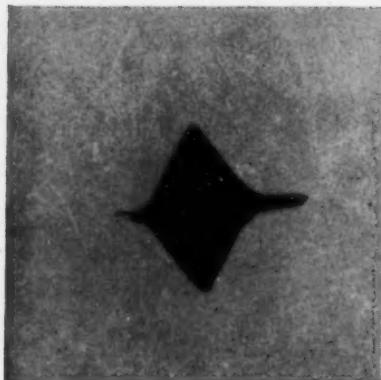
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The experimental craft is shown during tests at left. The break-up is shown at right.

BREAK-UP OF THE "RHOMBUS"

The Russian "flying rhombus" was designed by Artem I. Mikoyan (co-designer with Mikhail Gurevich of the MiG-15 and other fighters). The first two photos of the experimental aircraft were taken near Ramenskoye, the Soviet test base southeast of Moscow, on Feb. 24, 1954. The third photo shows the aircraft starting to break up on its last flight, June 19, 1954.

The "flying rhombus" had an esti-

mated rate of climb of between 165 and 180 feet a second. The design was mentioned by Mikoyan in a speech he made in Moscow in June. He also alluded to Russian developments in the VTO field, stating that wings are becoming increasingly superfluous.

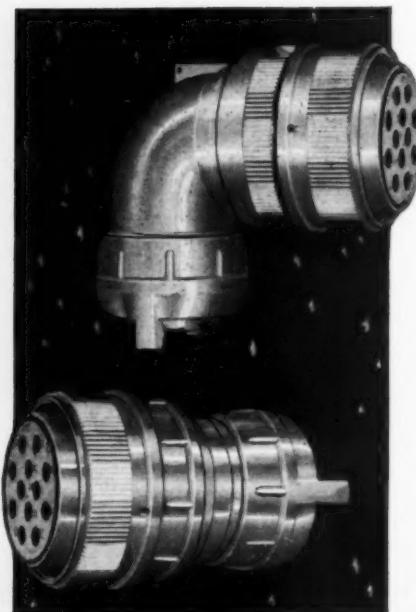
Mikoyan also remarked that the Soviet Union has long-range bombers which can circle the globe (but he did not specify at what latitude).



Designer Mikoyan (right)
Wings are superfluous.

Now! BENDIX·SCINFLEX waterproof plugs

for use with
multi-conductor cables



These new Bendix* Scinflex waterproof plugs are a modification of our standard AN type "E" (environment resistant) connector. They are designed to meet all "E" performance requirements when used with multi-conductor cables. Each plug includes a modified AN3057B cable clamp which provides inward radial compression on multi-conductor cables. This unique feature completely eliminates cable strain—a common source of circuit trouble.

In addition, there are gaskets at all mating surfaces and an accessory sleeve is available to accommodate an extreme range of cable sizes. A folder describing this new waterproof plug—and the various sizes in which it is manufactured—may be obtained by writing our Sales Department.

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SIDNEY, NEW YORK

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Circle No. 11 on Reader Service Card.

WHAT ARE THE ANSWERS TO HEAT PROBLEMS?

BY WILLIAM D. PERREAU

IT'S A STRANGE state of affairs when boiling water is used as a coolant, and perhaps that's the best way to describe the situation facing the aircraft and missile designer today. The country's most advanced piloted aircraft, the Convair XB-58 Hustler, will use boiling water to cut peak temperature brought on by supersonic flight at high altitudes.

But advanced as is the XB-58, it is only on the threshold of the almost unbelievable heat problems associated with flight speeds of 1500 mph and upward. Earlier this month a large cross-section of this country's top engineering brains gathered in New York for a *Symposium on the Thermal Barrier*, a two-day review of the whole problem sponsored by The American Society of Mechanical Engineers as part of its annual meeting.

Essentially this is what they concluded:

- The thermal barrier is not truly a barrier in the sense of an obstacle which might be hurdled and thus bypassed. It is a natural phenomena which becomes critical by existing engineering standards at below Mach 1.5 (about 1100 miles per hour) and gets increasingly worse at higher speeds.

- Heat problems are greatest in man-carrying aircraft because they arise from air friction against the aircraft surface, raising its temperature to values which destroy structural values. Pilotless aircraft which can fly above the thin layer of air surrounding the earth are less affected but may still burn up in meteorite fashion when they re-enter the atmosphere during their descent.

- A new and over-riding consideration has been added to the complex factors which determine the structural design of aircraft. This factor is time. Designs which can operate safely at Mach 3 speeds for 20 minutes might well be destroyed by identical flight conditions for 30 or 40 minutes.

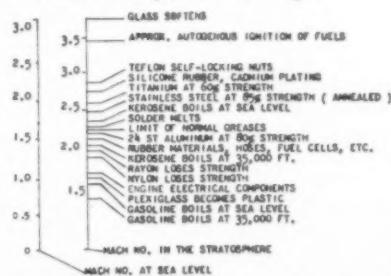
- Man's greatest ally in the fight for higher speed is the natural characteristic of many metals which make them poor heat conductors. Thus, heat applied on the metal surfaces of the wing takes a brief period of time to penetrate through the metal to the inner structure and to system elements.

- Combining low thermal conductivity of metals with the use of various insulating materials, and possibly the integral design of coolant systems for critical areas, may do much to push the thermal barrier toward hypersonic speeds.

More and more companies are being brought face to face with the thermal barrier problem in design studies of missiles or aircraft for supersonic flight and through military contracts designed to lay the groundwork for specific industry developments. For instance, Wright Air Development Center, according to R. B. Keusch of the Air Research & Development Command, has contracts with:

- Armour Research Foundation to "explore the basic parameters which should guide the selection of the method of driving aircraft accessories; namely mechanical, hydraulic, pneumatic, or electrical."

- Northrop Aircraft, Inc. for study of "significant parameters for powerplant cooling-system design" which will probably include such methods as gas boundary-layer bleed, water-stream system, and transpiration cooling.



Above—Mach numbers to which aircraft materials are limited by temperature (full stagnation temperatures are assumed.)



What can the human body stand? Chart shows schematically the magnitude of the physical variables in relation to the degree of comfort and safety experienced during flight?

- United Aircraft Corp. "to investigate the parameters pertinent to the oil-cooling problem in high speed flight and covering methods of oil cooling under conditions up to Mach 2.5, sea level to 80,000 feet and at various fuel and oil flows."

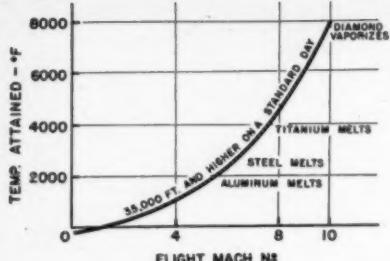
Thompson Products, Inc., recently completed a project investigating fuel characteristics under varying altitude and temperature conditions and the effect of pressurization on fuel vapor loss.

Fuel problems are some of the most pressing associated with the early stages of the thermal barrier. At sea level, gasoline boils at about Mach .8 and at altitude at under Mach 1.5, Kerosene boils at Mach 2.3 at altitude and under Mach 2 at sea level.

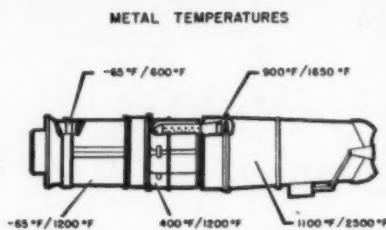
A Mach 2 bomber flying at 50,000 feet for 2½-3 hours would lose 18% of its fuel through vaporization, Keusch claimed, if the tank was unpressurized. Use of 1/16-inch cork insulation around the tank would cut this to 8% and insulation plus 4.5 psi tank pressurization would effectively eliminate such losses. These figures assume that the fuel is at 100° F initially. Refrigeration to cool the fuel prior to take-off would further reduce losses, but is not a fully satisfactory approach. For instance, a fuselage fuel tank with 60,000 lbs. of fuel will increase in temperature from 0° F to 120° in about 20 minutes at Mach 2.8 or in 40 minutes at about Mach 2.3.

Fuel temperatures of 120° F in the tank are at a marginal level because the fuel pumps, regulators, and other system components raise the temperature as much as 150° more en route to the engine. Somewhere between 250-300° F hydrocarbon fuels experience severe gumming tendencies.

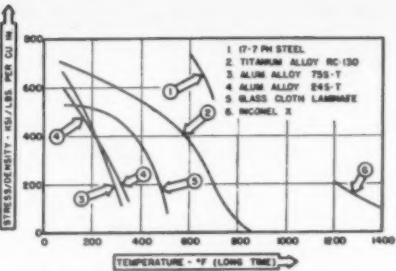
These factors have another serious effect on aircraft and component design. In present advanced aircraft designs, fuel is used as a heat sink, a place to dump heat from electronic components



Above: Temperatures attainable in sustained flight.



Above: Range of temperatures which turbojet engine components might be required to endure.



Above: Specific stress vs. temperature for minimum creep rate of 10⁻⁴% per hour (0.01 percent for 100 hours).

and other hot-running systems. En route to the engine, fuel travels through passages built around these hot items. The multiplicity of such needs plus the constantly increasing temperature of the fuel at high speed prevents this type solution to the heat problem.

Water appears to be the next best answer. Actually, according to J. Makowski and V. L. Whitney, Jr., chief research engineer and research engineer, respectively, with Stratos Div. of Fairchild, water is the best coolant per pound of weight or per unit of volume. Fuel is more attractive because it is carried for combustion purposes and therefore doesn't cut into payload. Otherwise water is about twice as efficient as a coolant as the next best practical liquid—methyl alcohol, which is about twice as efficient as typical jet fuel in this type application.

This is another reason why the size of aircraft is bound to continue to grow. Not only will coolants in large quan-

tities be required, but if truly high speed flight is to be attained, designers will have to resort to steel alloys instead of aluminum or titanium and these will be used in very heavy gauges. It is difficult to determine at what point this growth factor will level off but indications are that high temperature problems will force fighter growth to the size of some present-day bombers.

In the quest for new materials to meet the high temperature challenge, designers are fighting a complex problem. All of the common materials have areas in which they excel—24ST, 75ST, 78ST, titanium alloys, inconel, and steel. There are areas of overlap, conditions under which one metal is far superior to another in tension while inferior in shear, etc. Efficient use of the best metal in any specific application may bring about severe stresses under the radically different heat expansion at high speed. The result will be buckling, loss of contour, and possible failure of

parts.

Past heat problems faced by engine designers will seem insignificant in light of future problems. At subsonic speeds and high altitude operation, air enters the jet engine (see drawing) at minus 65° F, leaves the compressor at 400°, heats combustion chamber parts to 900°, and heats the turbine to 1100°. Supersonic engines will take air in at 600° F, compress it to 1200°, heat combustion chamber metals to 1600°, and leave the turbine with temperatures up to 2500°.

This means that the critical metals content of the engines is likely to go sky-high. Critical materials now confined to the turbine blades will have to be used in many of the up-front areas and the solution to turbine temperatures, unless it is liquid cooling, is not evident as yet.

Answers to the whole thermal barrier problem fall into several major categories: new and heavier gauge metals, extensive cooling of the entire plane's surfaces, insulation, and controlled melting of predetermined areas. Work by the National Advisory Committee on Aeronautics, described during the ASME meeting by C. H. McLellan of Langley Aeronautical Laboratory, provided interesting aspects of the latter method.

Using Good's metal, a metal with a melting point of about 150° F, NACA constructed wind tunnel models with special cylindrical and conical nose structures. These were used in a wind tunnel operating at Mach 6.9. In each instance the nose structure started to melt in about five seconds time. Significant was the pattern of melting, largely limited to the small area nose and progressing in a simple pattern.

These experiments hold out hope that the designer may be able to take a lesson from the meteorite. When meteorites enter the earth's atmosphere the heat generated by friction causes the outer surface to burn but this dissipates the heat and protects the center-body. Using comparable methods, engineers may design vehicles with areas meant to burn away without destroying the machine nor disrupting its stability.

■ 240-ACETONE
■ 95-CARBON TETRACHLORIDE
■ 370-ETHYL ALCOHOL
■ 100-FREON 12
■ 160-TYPICAL JET FUEL
■ 495-METHYL ALCOHOL
■ 970-WATER

APPROXIMATE LATENT HEAT OF VAPORIZATION, BTU PER POUND

■ 11,900-ACETONE
■ 9,450-CARBON TETRACHLORIDE
■ 18,200-ETHYL ALCOHOL
■ 7,900-FREON 12
■ 8,000-TYPICAL JET FUEL
■ 24,800-METHYL ALCOHOL
■ 160,600-WATER

APPROXIMATE VOLUMETRIC LATENT HEAT OF VAPORIZATION, BTU PER CUBIC FOOT

■ 54-ACETONE
■ 24-AIR
■ 21-ALUMINUM
■ 22-CARBON TETRACHLORIDE
■ 63-ETHYL ALCOHOL
■ 24-FREON 12 (LIQUID)
■ 50-TYPICAL JET FUEL
■ 25-MAGNESIUM
■ 60-METHYL ALCOHOL
■ 11-STEEL
■ 100-WATER

APPROXIMATE SENSIBLE HEAT ABSORPTION PER POUND PER 100°F TEMPERATURE RISE, BTU

Above: Thermal capacity per pound for various materials.

■ 2,670-ACETONE
■ 1.84-AIR
■ 3,610-ALUMINUM
■ 2,190-CARBON TETRACHLORIDE
■ 4,070-ETHYL ALCOHOL
■ 2,200-FREON 12 (LIQUID)
■ 2,500-TYPICAL JET FUEL
■ 2,725-MAGNESIUM
■ 3,000-METHYL ALCOHOL
■ 5,340-STEEL
■ 6,240-WATER

APPROXIMATE SENSIBLE HEAT ABSORPTION PER CUBIC FOOT PER 100°F TEMPERATURE RISE, BTU PER CU. FT. PER 100°F RISE

Above: Thermal capacity per cubic foot for various materials.

West Coast Talk... By Fred S. Hunter

- Vertical rising bombers?
- Do airlines contribute to smog?
- When does aircraft noise become offensive?

THE AERO CLUB of Southern California, which is another name for the National Aeronautical Association chapter in these parts, is getting so rich its executive secretary, Dot Lemon, is being inspired by lofty sentiments. The lively redhead, who never lacks for ideas, thinks a useful purpose might be served if the excess dough were used to endow a chair at Claremont College. The Aero Club's new affluence comes from the benefice of Bert Rhine, Dave Callahan, Clyde Barnett, and the others in the official NAA timer group in Los Angeles. They've been donating their fees to the chapter. What with the speed rivalry between the Douglas F4D and the North American F-100 and various other events, timer fees at \$35 per man have been mounting. Couple of years ago the Aero Club was practically dead broke; today its treasury bulges with \$2,300 in surplus cash from these fees.



HMM! LOCKHEED employment advertising for engineers in a Los Angeles paper the other day listed as among projects in development "advanced versions of vertical rising bombers." Bombers?

CONGRESSMAN Edgar W. Hiestand, caught in the highway traffic, arrived half an hour late at a meeting at the Los Angeles International Airport where he was on the program. "What we need right away," puffed the congressman, "is helicopter service to Altadena."

FRED MILAM, manager of transportation for Los Angeles Airways, won't be satisfied until he can set a connecting passenger from a transcontinental trip down in Long Beach before the last passenger from the same trip has picked up his baggage in front of the Los Angeles airport . . . O. M. MOSIER, American Airlines' v. p.-operations, is said to favor a high wing for the company's proposed four-engine turboprop to simplify the ground equipment interference problem . . . JOHN MYERS,

Northrop v. p. always keeps up to date, so he's traded in his "old" Corvette on a snazzy new Thunderbird.

NOW THAT United Air Lines is replacing its Boeing Stratocruisers with Douglas DC-7's on the Honolulu run beginning Jan. 1, the Los Angeles smog sleuths can relax. UAL actually was cited by the air pollution control authorities on charges its Stratocruiser engines smoked up the airport too much. The Stratocruisers were singled out because of UAL's system of flooding the rocker boxes of the R-4360 engines to prevent carbon accumulation on valve springs and valve stems. Makes a lot of smoke, naturally. The smog cops have made inquiries at Pan American, which also operates the R-4360-powered Boeings, but so far no citation. Smog is touchy stuff in this town.

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THIS BUSINESS of aircraft noise continues to baffle. We're reminded, for example, of a demonstration flight in Allison's T38-powered Convair. An Allison engineer, at its conclusion, asked a passenger what he thought of the cabin noise level of the turboprop power. "Oh, I'd say it was about the same as a DC-7" was the reply. Needless to say, the gentleman from Allison was completely nonplussed at this unexpected reaction. The other day, 44 F-86's from George Air Force Base staged a fly-by over Los Angeles at minimum altitude by way of a parting salute prior to departing for England. This was at noon when the normal noises of the city, no doubt, were at their highest. Maybe the fly-by was at reduced power, but they appeared to be moving along fast enough. Point is the whole kit and kaboodle of 44 jets didn't seem to make any more noise than a DC-4 short-cutting over the rooftops between the Los Angeles International Airport and Lockheed Air Terminal at night. So how do you measure offensive aircraft noise?

Uneven driving forces during rivet installation can crack skin panels. Rework is costly.



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A17ST collar accommodates the HS25 75ST pin.



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Circle No. 12 on Reader Service Card.

New Products and Processes

Douglas and Northrop Speed Production, Reduce Costs of Aircraft Parts Finishing

In almost simultaneous announcements both Douglas Aircraft Co., and Northrop Aircraft, Inc., have unveiled new automatic facilities to speed production and cut costs in aircraft parts finishing. Both utilize the new flow coating principle in which paint is applied by a bank of nozzles at very low pressures.

The Douglas-El Segundo Div. installation at its Torrance, Calif., plant

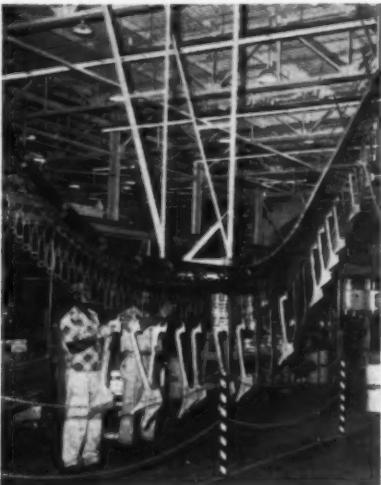


Northrop flow coater

was designed by Industrial Systems, Inc., and is capable of flow coating 6400 parts an hour. Five production locations feed parts to a 2100-foot-long overhead monorail which can be varied in speed from 10 to 30 feet per minute.

Parts entering a 378-foot-long tunnel move through 12 automatic phases. Before actual coating, Alkaline spray cleaner and Alodine 1200 are applied and rinsed. Application of a hot chromic acid, oven drying, and a cold air blast follow. Once coated, the parts enter a 190°F oven, then pass on to a central unloading area for inspection and distribution.

The Northrop flow coater, which was produced by Ericson Manufacturing Co., has increased production by an estimated 116% while manpower requirements have been cut 12%.



Douglas coats 6400 parts an hour.

Overall dimensions of this unit are: 23 feet long, 11 feet 6 inches high, and 8 feet 2 inches wide. Parts are spaced 12 inches apart on a 320-foot-long conveyor, and enter it at a speed of 10 feet per minute. Parts leaving the Northrop coater pass through a compressed air blower area to remove droplets, and then enter a 14-foot-long drying zone where 192 infra-red lamps maintain a controlled 150-180°F temperature.

Toggle Switch

New miniature toggle switch announced by Hetherington, Inc., measures only 1 5/16" long by 15/32" diameter and is rated for service up to 5 amps inductive or 10 amps resistive.

The Hetherington T-2104 switch

uses a two-circuit contact arrangement in which alternate positions of the switch can be used to complete two separate circuits. For conventional single pole-double throw operation a jumper can be added between contacts.

Circle No. 37 on Reader Service Card, page 65, for more information.

Hydraulic O-Ring

Temperature rating of from 300° F to -65° F is provided by a new hydraulic o-ring manufactured by the Parker Appliance Co. No appreciable deterioration was noted after the ring's compound had been exposed to 50,000 cycles in MIL-O-5606 fluid at 300° F. All standard sizes.

Circle No. 44 on Reader Service Card, page 65, for more information.

Instrument Panels

A new laminated plastic instrument panel material called Gravoflex developed by Hermes Plastics, Inc., is said to be 27% lighter than laminated phenolic types and 62% lighter than aluminum.

Gravoflex is guaranteed shatter-proof and can be bent to any form to follow the shape of an instrument housing, the manufacturer states. In contrast with laminated phenolics which require expensive carbide-tipped tooling, it can be sheared, die-cut or punched.



Circle No. 36 on Reader Service Card, page 65, for more information.

Rotary Actuator

A 0.7 hp rotary actuator has been developed by Western Gear Works to run on 200-volts, 400-cycle, 3-phase cur-

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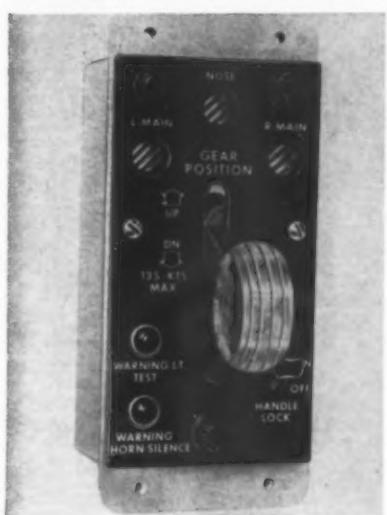


rent. Locked rotor torque is 12 lbs. with 11,200-rpm input, 38-rpm output, 7 amps continuous duty.

Circle No. 23 on Reader Service Card, page 65, for more information.

Landing Gear Control

Composite landing gear panel, 3½" x 6½" x 2", contains all controls and indicators. Developed by Avionic Products Engineering Corp., the unit (model



A401) features a red warning light inside a wheel-shaped knob, a solenoid lock to hold handle in down position when aircraft is on ground, and pushbutton to silence warning horn.

Circle No. 21 on Reader Service Card, page 65, for more information.

Welding Rig

A new handling rig to speed up welding or riveting operations when handling multi-contoured aircraft assemblies has been announced by Martin



Aircraft. The new unit suspends an assembly part at its center of gravity so that it is completely free swinging and easily handled by a single operator.

Circle No. 40 on Reader Service Card, page 65, for more information.

Test Chamber

The Model D-102 environmental test chamber introduced by Mantec, Inc., has a working volume of 12 cubic feet and operates over a temperature range of -100°F to +300°F.

The unit uses a dry ice and fan combination for low temperature testing and an electrical element with levels ranging from 450 to 1850 watts for heating. From room temperature the cham-



ber can be lowered to -60°F in about 40 minutes or raised to 300°F in about 20 minutes.

Circle No. 39 on Reader Service Card, page 65, for more information.

Fire Seals

Firewall sealing materials being offered by Arrowhead Rubber Co. include sponge rubber and other materials in fiberglass fabric. Fireproof under 2000°F flame for 15 minutes. Designated Fyre-tite, the material is available in a wide range of sizes and shapes.

Circle No. 25 on Reader Service Card, page 65, for more information.

Taper Pin Terminals

Four new terminals have been added by Lynn Electronic Research Co.:

double-end taper, taper from front, taper from back, and taper from front with blind hole. Half-hard brass bar, with copper flash and electro-tin plate finish.

Circle No. 42 on Reader Service Card, page 65, for more information.

Shock Mounts

All-metal miniature vibration isolators for airborne gear have been developed by The Barry Corp. The mounts, known as All-Metal M 24, 23, 22, or 21 Series, work at temperatures from 175°C to -60°C. are rated for loads of 0.9 to 3.0 lbs., stand 1" or ½" high, and are designed for vibration isolation above 15 cycles per second. Differences between the four series are in the



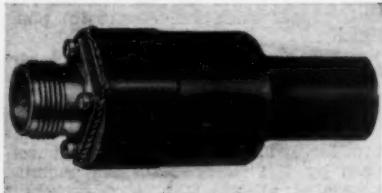
height, location of mounting plate, and number of mounting holes. Performance characteristics are the same.

Circle No. 26 on Reader Service Card, page 65, for more information.

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Bendix Missile Section is a major contractor in the U. S. Navy's guided missile program--a part of the "new look" in our defense plan. Our expanding program has many opportunities for senior engineering personnel: Electronics Engineers, Dynamicists, Servo-Analysts, Stress Analysts, Project Coordinators, and Designers. Take time now to look into the opportunities which Bendix can offer you. Write Employment Dept. M, 401 Bendix Drive, South Bend, Indiana.

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Miniature switches built to withstand large surge pressures, housed in aluminum castings, and unaffected by mounting position, for use in aircraft, rockets, and missiles. Approximate weight, 4 oz. duration over 100,000 cycles. Manufactured by Leach Relay Co.

Circle No. 22 on Reader Service Card, page 65, for more information.

Ejection Seat Spacer

A new plastic spacer developed by Riverside Plastics, Inc., is designed to fill the area of pilot seat backs which has been vacated by relocation of oxygen equipment. Fabricated from reinforced polyester resins, the new filler weighs less than 1.5 lbs. It has been ordered by Douglas and Republic.

Circle No. 31 on Reader Service Card, page 65, for more information.

Bulkhead Mount

A new aircraft instrument mounting system designed by Robinson Aviation, Inc., includes three all-metal double-acting mounting units which combine to give a natural frequency of 15 cycles per second. The Robinson Model 1102 system is intended for multi-directional

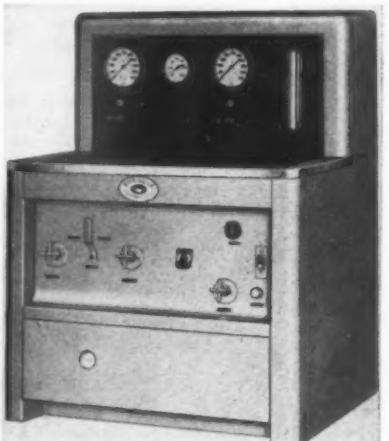


protection of instruments installed on airframe bulkheads or structures.

Circle No. 32 on Reader Service Card, page 65, for more information.

Test Stand

Hydraulic test stand manufactured by Sprague Engineering Corp., Model S-1000-6C3, operates up to 3000 psi and flows up to 6 gpm. Controls are in front; pressure outlets point away from operator. Flow control valve, flowmeter, and oil cooling circuit.



Circle No. 24 on Reader Service Card, page 65, for more information.

Coolant Pump

A new electric motor driven ethylene glycol circulating pump developed by Lear, Inc., Lear-Romec Div., weighs 5.7 lbs. and is rated at 1.45 gpm output at 140 psi discharge pressure.



Circle No. 38 on Reader Service Card, page 65, for more information.

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METAL CLOSURES for Aircraft
Hydraulic Lines and Components



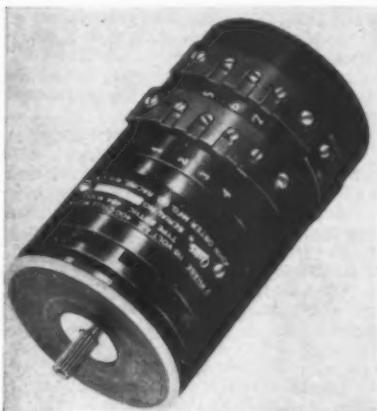
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Self-cooled servo weighing 3.188 lbs. pulls 1/15 hp. at 6000 rpm and produces



22 oz.-inches of stall torque. Designed by John Oster Manufacturing Co., with an independent blower, for radar antenna drive or similar applications.

Circle No. 99 on Reader Service Card, page 65, for more information.

Sealant

A new sealant, No. 1372, is in volume production at the Permatex Co. A test seal remained pressure-tight at temperatures up to 650° F under internal pressures of 165 psi, and under vibration of 142 cps, with a double amplitude of 6.012".

Circle No. 46 on Reader Service Card, page 65, for more information.

Plastic Sheeting

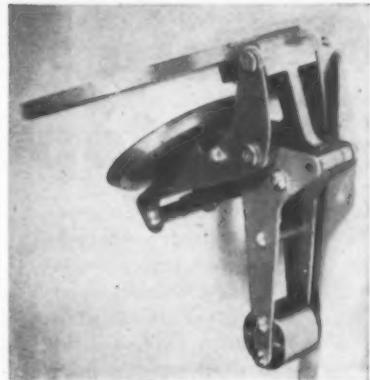
Glass-in-plastic formable laminate called "Scotchply" is designed for mass production of reinforced plastic parts and structural members. Each moldable sheet is reinforced with aligned glass filaments and is composed of 60% glass and 40% plastic resin, by weight. Equal strength in all directions in the plane of the laminate can be obtained by laminating the sheets to each other at 120° angles.



Circle No. 43 on Reader Service Card, page 65, for more information.

Flapper Valve

A new aircraft fuel valve developed by Aero Supply Mfg. Co. incorporates a pendulum-controlled inertia latch to



protect against excessive forces from the movement of fuel during flight.

Normally the value is in the open position permitting unrestricted flow in both directions. When the aircraft assumes a position at which the fuel could move out of control, the pendulum unlocks the latch and closes the valve.

Circle No. 33 on Reader Service Card, page 65, for more information.

Plastic Tooling

Rezolin, Inc. has announced development of a new compound to prevent Epoxy resins from sticking to plaster, wood, and metallic molds. The Rezolin product is a film-forming, low-shrink plastic solution that can either be sprayed or brushed onto the mold.

Circle No. 30 on Reader Service Card, page 65, for more information.

New BRANIFF Time Payment Plan

opens a whole new world of travel business

Plan covers all Braniff flights, anywhere in North America, South America or the Caribbean area. It may also be made to include hotel accommodations, tour fee, connecting airline and surface transportation. It's a complete travel package.

The customer pays as little as 10% down and the balance in as many as 20 monthly payments. No co-signers, no collateral.

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Circle No. 15 on Reader Service Card.

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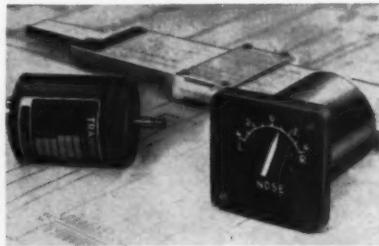


The panels include: d-c available, single- or multi-generator systems; d-c not available, single- or multi-generator systems. Designed to meet military specs.

Circle No. 29 on Reader Service Card, page 65, for more information.

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New remote indicating system for aircraft wing flaps, landing gear, and trim tabs introduced by Avien, Inc., features a miniaturized indicator that requires only 1.75" of panel space.



The system uses a 3-wire, d-c synchro drive combined with a tapped transmitter winding and 3-coil electromagnetic type indicator to remotely present readings of the rotation of the transmitter shaft. Literature available.

Circle No. 35 on Reader Service Card, page 65, for more information.

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Circle No. 27 on Reader Service Card, page 65, for more information.

People

FOLLOWING the reorganization of F. A. V. Roe Canada Ltd. into a three company group—Avro Aircraft Ltd., Orenda Engines Ltd., and Canadian Steel Improvement Ltd., top personnel lines up as follows:

A. V. Roe Canada (parent company)—Crawford Gordon, Jr., president and gen. mgr.; A. A. Ballie, v.p.-finance, and W. H. Dickey, v.p.-industrial relations.

Avro Aircraft—F. T. Smye, v.p. and gen. mgr.; J. C. Floyd, v.p.-engineering; H. R. Smith, v.p.-manufacturing, and J. A. Morley, v.p.-sales and service.

Orenda Engines—W. R. McLachlan, v.p. and gen. mgr.; C. A. Grimyer, v.p.-engineering; E. K. Brownbridge, v.p.-manufacturing, and F. L. Trethewey, v.p.-sales and service.

Canadian Steel Improvement—C. J. Luby, president and gen. mgr. and J. A. Wellings, v.p.



Schulte



Gordon

Manufacturing

Donald H. Culver promoted from divisional auditor of Pratt & Whitney Aircraft Div. to assistant treasurer of United Aircraft Corp. Albert S. Roberts moves up to divisional auditor from ass't and is succeeded by Joseph P. O'Brien.

Gen. Harold L. George (USAF Ret.) elected senior v.p. of The Ramo-Woodridge Corp.

W. J. Broderick, formerly military relations representative for Lockheed Aircraft Service in Dayton, moved to Sacramento as sales coordinator for the Georgia Div., Lockheed Aircraft Corp.

R. C. Schulte, former CAA region two powerplant engineering chief, appointed commercial aircraft engine sales engineer for Allison Div., General Motors Corp.

Airlines

Robert Law, formerly U. S. region operations mgr. for Philippine Air Lines, appointed station mgr. at San Francisco for Qantas Empire Airways.

S. J. Wasuta appointed acting chief engineer of Capital Airlines, filling in for Ian Caldwell sent to England as CAP's resident representative. E. G. Erickson is project engineer—Viscounts—for the domestic phase of CAP's Viscount program.

Carlos Insua named personnel supervisor of Pan American-Grace Airways, succeeding W. W. Pressley, now air cargo superintendent.

R. K. Kearns promoted from United Air Lines ass't sales mgr. in Denver to district passenger service mgr. in Washington, D. C.

By William V. Henzey

UNDER THE WATCHFUL eyes of the departments of Justice and Commerce, the Civil Aeronautics Board, on November 26, submitted its decision to the White House in the controversial New York-Balboa Through Service Case for the third time in four years.

The decision, which remains unpublished pending Presidential action, provides for:

- Disapproval of the voluntary interchange agreement between Eastern Air Lines and Pan American World Airways, which was designed for participation by Panagra, and which involved through one-plane service between New York and South America.

- Finding that it would be in the public interest for Braniff Airways and Eastern Air Lines to enter an agreement for a New York-South America interchange service with Miami as the junction.

- Finding that it would be in the public interest for National Airlines, Pan American, and Panagra, to enter a similar agreement. And . . .

- Finding that the record be kept open for 60 days after decision to permit the suggested interchange partners to work out agreements.

Essentially, this is the same decision which CAB first submitted for action by former President Truman in June 1952, and later for action by President Eisenhower in early 1953. Truman sat on it for six months and returned it to CAB the day before Eisenhower took office with instructions to re-submit it to the new President.

In May, 1953, Eisenhower returned it to CAB to bring the record up to date, setting the stage for the present situation.

In the latest decision, however, board member Oswald Ryan cast a dissent in the vote disapproving the voluntary Eastern-Pan Am agreement. He also joined vice chairman Harmar D. Denny in dissenting from a majority vote which would prevent Eastern and Pan Am from implementing so-called "Caribbean" phases of their agreement.

Behind the majority's action is a finding that Pan Am, Eastern, and Panagra would, in effect, dominate the market if aligned in one service against National and Braniff.

The Justice Department is keeping an eye on the case because of its pending anti-trust suit against Panagra and its co-owners, Pan Am and W. R. Grace. That suit was filed last January but court action is not anticipated for some time. Justice concern was also evident in the spring when CAB deferred ruling

on the Balboa interchange pending results of a suggestion that Panagra and Braniff work out a merger.

Commerce Department has been interested in the case because of international policy considerations of the Commerce-backed ACC Civil Air Policy Report. Commerce also is said to oppose the anti-trust suit and to have favored a Panagra proposal to absorb Braniff.

At press time, the latest CAB decision was located physically in the Bureau of the Budget which acts as coordinator for the President of other departments' views.

There were no indications when the President would get the case and act upon it. Meanwhile, CAB is still looking for the Administration to approve a major international air route decision.

Future of Surface-Mail-by-Air Experiment Now Up to Courts

While five western railroads were in court last week spearheading a rail industry fight against the airlines carriage of first-class mail, an increasingly larger portion of the population, engrossed in Christmas mailing, was benefiting from the service which has now spread to virtually every scheduled airline in the country.

The surface-mail-by-air experiment is still just that—an experiment. Many of the local service airlines, for example, carry first-class mail only on a few designated flights and between a few pairs of points. But whereas last year at this time there was only one operation—trunk carriers between New York/Washington and Chicago—this year both coasts and a good section of

the country in between are receiving the service in varying degrees.

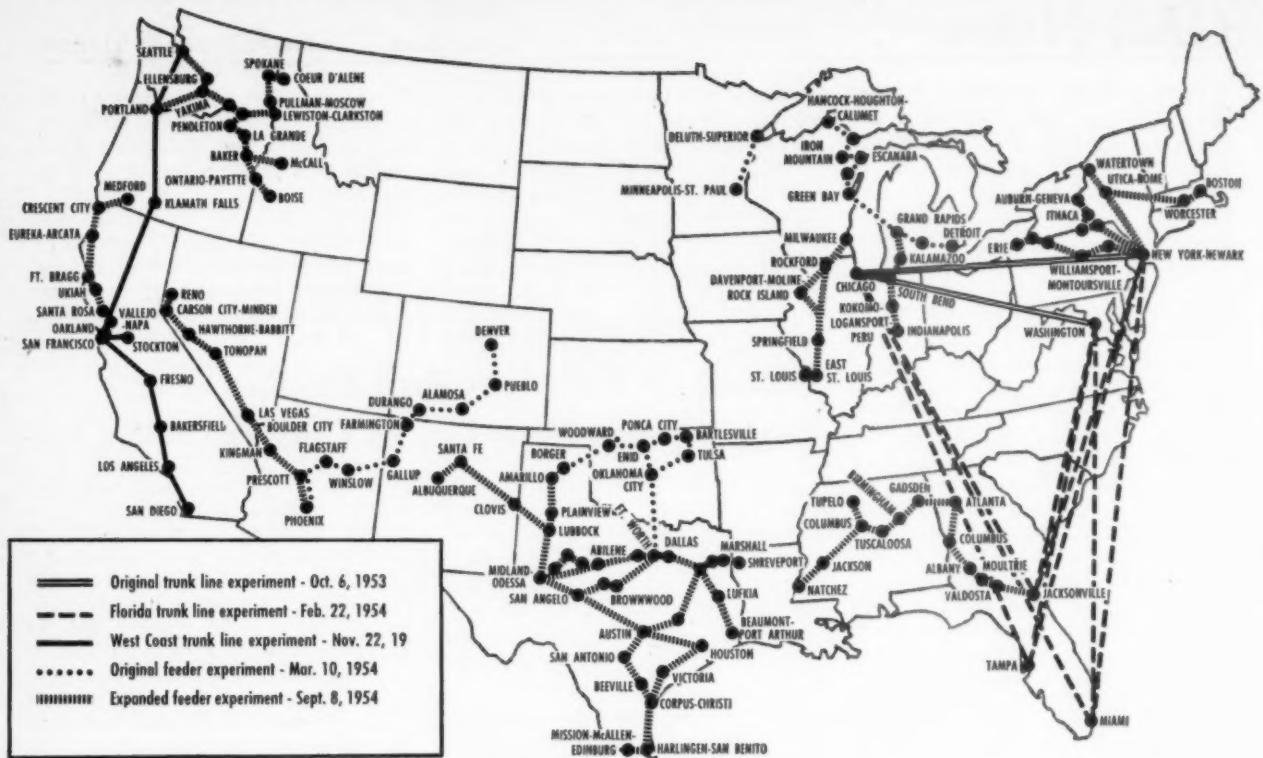
At the most, the airlines will get about \$3 million in annual revenues for the service now under way, in exchange for which the Post Office will get about \$30 million in postal revenues and the public will get a faster mail service.

The railroads carried their fight against the airlines' "invasion" of their mail revenues to court after unsuccessful efforts to get CAB to refuse to set rates for the west coast trunk-line experiment. Main theme of the railroad attack is that the Postmaster General is not authorized to ship first class or 3¢ mail via air carriers.

The Department of Justice, representing the Post Office in court, had
(Continued on next page)



BRINGING IN HIS T-33 Silver Star jet trainer for a landing at Cartierville Airport, Montreal, Test Pilot Ed Coe, of Canadair Limited, struck a flock of pigeons, killing 10. When the mechanics cleaned the remains from the aircraft, the above design was found embedded in one of the wing tanks.



Experiment: 3 Cent Mail by Air.

opposed the rails' suit, claiming the railroads had no legal interest in mail transportation other than the desire to continue in the business themselves and "an interest in immunity from economic competition."

Postmaster General Arthur E. Sumnerfield said before the court hearing that if an injunction is granted it will "gravely impair the mail service to the general public."

In many sections, the court fight

was viewed as the key to the future of the surface-mail-by-air experiment. If the rails are unsuccessful in the courts, however, they will still have CAB's full-scale rate investigation which will get under way early in 1955.

CAB Calendar

Jan. 5—Hearing, Delta-C&S Route Junction Case. Washington, D. C. Docket 6848.

Jan. 5—Hearing, Guatemala City-Los Angeles Renewal Case (Pan American). Washington, D. C. Docket 6615.

Jan. 17—Hearing, Reopened Trans-Atlantic Final Mail Rate Case. Washington, D. C. Docket 1706 et al.

Jan. 18—Hearing, Pan American-LACSA Control Case. Washington, D. C. Docket 6594.

Jan. 25—Hearing, Davenport-Moline Airport Case. Washington, D. C. Tentative. Docket 6804 et al.

Feb. 2—Hearing, Reopened Fayetteville Service Case (Central Airlines). Tentative. Docket 5592.

Mar. 7—Hearing, Domestic Trunk-lines Service Mail Rate Case. Washington, D. C. Docket 6599 et al.

As of now . . .

Both the New York-Chicago Service Case and the North American Airlines Enforcement Case are about ready for examiners' reports. But a procedural move by North American, seeking to have CAB direct examiner William F. Cusick to issue the New York-Chicago

report first, must first be ruled on by the board.

CAB is planning to issue its decision in the Trans-Atlantic Final Mail Rate Case momentarily, although the important "offset" phases of the case have been severed for new proceedings. While many important policy matters will be ruled on in the coming decision, total mail pay for Pan Am and TWA will not be finally ascertainable until the offset issues are decided.

Recent CAB Decisions

Japan Air Lines' foreign permit amended to extend the Tokyo-Okinawa segment beyond Naha, Okinawa, to Hong Kong.

Braniff Airways' authority to serve Owatonna-Fairbault-Waseca, Minn., permitted to expire; authorization granted to suspend at Austin-Albert Lea, Minn.

Eastern Air Lines turned down on request for elimination of language from previous board order in Eastern-Colonial Control Case which referred to EAL's "efforts to conceal its illegal acquisition of control" of Colonial.

Examiners' Reports

Allegheny Airlines recommended to serve Trenton between Philadelphia and

New York by Examiner F. Merritt Ruhlen. Interim suspension of Trenton from routes of Eastern and United also proposed.

Compania Dominicana De Aviacion recommended by Examiner Joseph L. Fitzmaurice to serve Cap-Haitien and Port-au-Prince, Haiti, as new intermediates between Ciudad Trujillo and Miami.

Aerovias Venezolanas, S. A. (AVENSA) recommended for a foreign air carrier permit by Examiner Curtis C. Henderson for Caribbean service between Venezuela and Miami/New Orleans.

CAB Applications

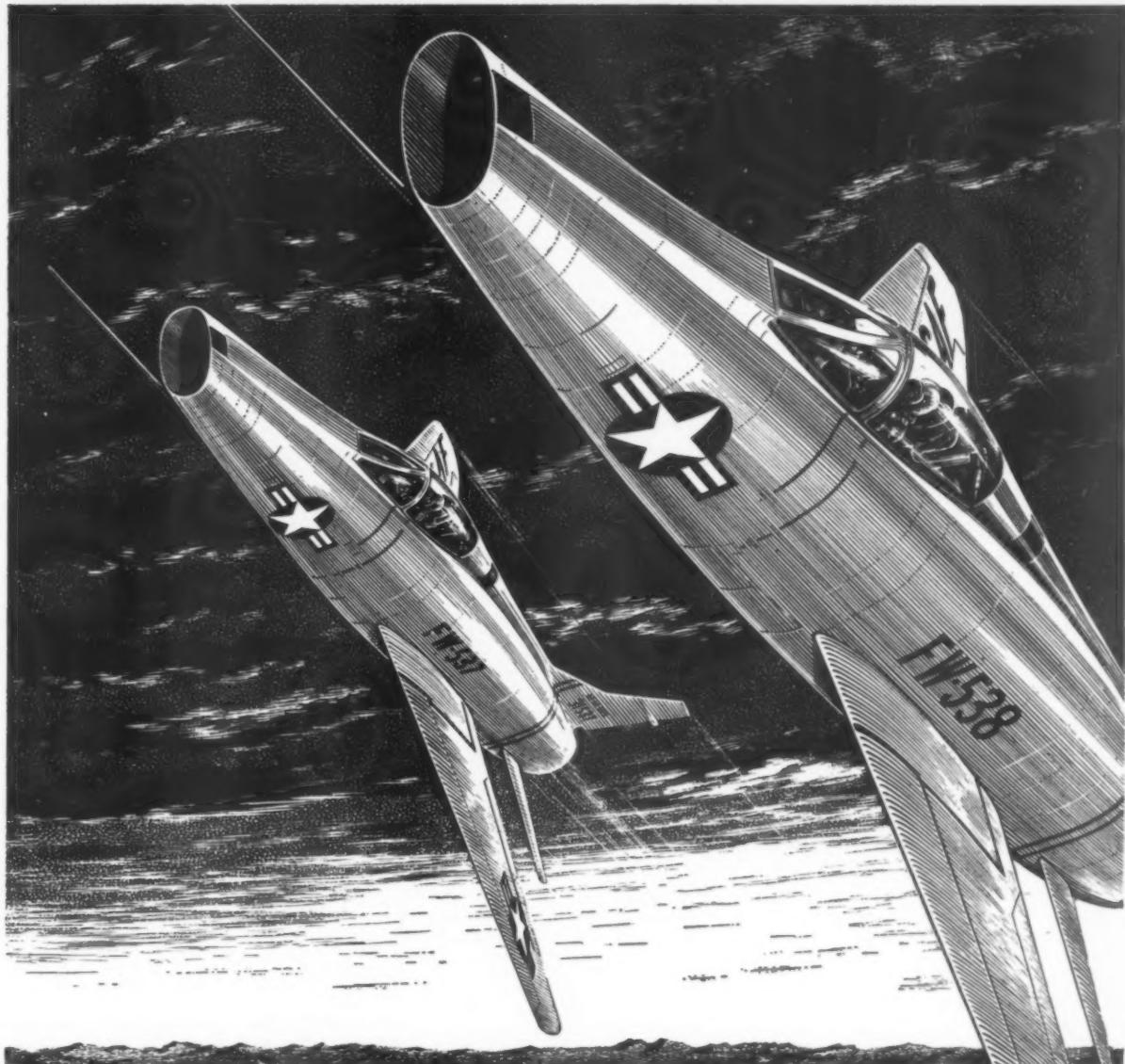
Delta-C&S Air Lines applied for indefinite extension of authority to suspend at Kingston, Jamaica, in favor of service to Montego Bay.

Resort Airlines applied for special exemption to carry military personnel on furlough between Dec. 15 and Jan. 15.

Eastern Air Lines appealed to CAB to reverse ruling of examiner Edward T. Stodola in which he refused to subpoena Government officials to testify in New York-Mexico City Nonstop Case.

Mohawk Airlines applied to serve Glens Falls, N. Y., and Keene, N. H., on Utica-Boston segment.

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ENGINEERING AHEAD FOR A BETTER TOMORROW

NORTH AMERICAN AVIATION, INC.

Pan Am dominant carrier in Alaska . . .

Board Votes Permanency for Northwest In Alaska-Pacific

THE CAB has decided to grant Northwest Airlines permanent routes through Anchorage, Alaska, to Tokyo, and to give remaining States-Alaska air rights to Pan American World Airways.

The board's vote, taken Dec. 8 at a turbulent meeting, was the latest and perhaps final shuffling of votes in the controversial cases involving U.S. air service to Alaska and across the Pacific Ocean. The decision would completely eliminate Pacific Northern Airlines, almost a cinch for renewal only a week ago, and Alaska Airlines from the States-Alaska market.

At presstime, various CAB sources indicated the decision was being prepared for early submission to the White House for Presidential action.

Here is what that decision calls for.

- **Renewal** of Northwest Airlines from Seattle to Anchorage to Tokyo on a permanent basis with full shuttle rights between Seattle and Anchorage. Also, renewal on a temporary basis of other NWA routes in the Pacific beyond Tokyo to Manila.

- **Renewal** on a temporary basis of Pan American World Airways Honolulu-Tokyo route, thus preserving that carrier's through mid-Pacific route to Tokyo from the U.S. Also, dismissal (in lieu of denial or approval) of PAA's request for non-stop rights between the U.S. and Tokyo via the North Pacific route.

- **Certification** of Pan American to serve Anchorage in addition to its present States-Alaska routes to Juneau and Fairbanks.

- **Non-renewal** of the Seattle/Portland-Fairbanks route of Pacific Northern Airlines and the Seattle/Portland-Fairbanks route of Alaska Airlines.

- **Refusal** to grant necessary extensions to Trans World Airlines or Northwest to permit a round-the-world hook-up at Tokyo. There was minority strength, however, for permitting a TWA-Northwest link at Hong Kong.

The Dec. 8 meeting grew so heated at one point that a board member walked out, returning in the evening for the final vote.

If approved by the President, it means that the States-Alaska market will have two airlines instead of the present four, with Pan American the predominant carrier with access to both major Alaskan markets—Anchorage and Fairbanks.

Biggest surprise in the vote was the switch from Pacific Northern which had been supported by the CAB staff

and CAB's chief examiner, Francis W. Brown. Just a week before, the board was aiming at renewing PNA but recommending a merger between PNA and Alaska Airlines.

The two lines, which also operate intra-Alaskan routes which are not at stake in the pending case, had discussed a merger this fall but were unsuccessful in reaching an agreement. Whether the thought of both being eliminated from the States would stimulate new merger talks before the President rules on CAB's decision was the subject of speculation in various government circles.

For Northwest, the board's decision provides virtually all that carrier sought in the cases with the exception of a requested extension to connect with TWA. One month ago, after the board decided to renew NWA's Seattle-Tokyo route, three members threw the entire Trans-Pacific Case into a turmoil by voting against renewal of NWA to Anchorage.

As a result, previous votes were withdrawn and the cases became wide-open. So-called "chosen instrument" arguments which had marked earlier phases of the case were again prominent.

As late as the morning of Dec. 8 there was a move in CAB to grant Northwest only a five-year renewal of its Seattle-Tokyo route and to eliminate it from Anchorage.

But when the smoke cleared that evening, there was a three-man majority voting for permanent certification to Tokyo with full rights at Anchorage.

Pan American had been seeking to supplement its mid-Pacific route to Tokyo with a non-stop authorization which would permit a U.S.-Tokyo service paralleling NWA's North Pacific route. This had been voted down by the board in September, but under the reshuffling of votes, it was decided not to deny Pan Am, but to dismiss its application without prejudice.

The decision on States-Alaska routes caught the CAB staff by surprise too. The board's Bureau of Air Operations had supported a two-carrier network, but Pan American and PNA were its choices. CAB examiner Brown had recommended a three-carrier system, PAA, PNA, and Northwest, urging non-renewal of Alaska Airlines.

It had been the argument of the board's staff on Dec. 8 that it would actually be beneficial for Northwest if its Anchorage authorization were not renewed. This argument led to the walk-out of one board member.

Because there have been numerous changes in the board vote in these cases over the past three months, statements that the case is now ready for submission to the White House should be taken with reservations. But sources close to the cases insist this is the final vote.

Leading the fight for NWA's permanent certification and continued Anchorage rights were members Denny, Lee, and Adams. The latter two are also said to have cast a dissent with respect to the final network of States-Alaska routes. • • •



* * * Preston R. Bassett, Sperry Gyroscope Co. president, Great Neck, N. Y. 40 years.

* * * Charlie Thompson, Boeing Airplane Co. welding dept. gen. foreman, Seattle. 35 years.

* * * Fred P. Laudan, Boeing Airplane Co. v.p.-manufacturing, Seattle. 35 years.

* * * Henry J. Fischbeck, Pratt & Whitney Aircraft metallurgist, East Hartford.

* Donald S. Hersey, Pratt & Whitney Aircraft supervisor-design services, East Hartford.

* Carroll B. Hurlburt, Pratt & Whitney Aircraft coordinator, East Hartford.

* Thomas C. Munson, Pratt & Whitney Aircraft mechanic, East Hartford.

* Ricardo Arango, Jr., PAA d.t.s.m., Panama City.

* Dwight M. Barnes, PAA senior procedure coordinator, Miami.

* Henry L. Wilson, PAA mechanic, Miami.

* James E. Haywood, PAA master mechanic, Brownsville.

* Howard Reimel, Douglas Aircraft hydraulics and landing gear leadman, Santa Monica.

* Catherine Simokat, Secretary to Igor I. Sikorsky, Sikorsky Aircraft, Bridgeport.

* Martin Dardani, Sikorsky Aircraft machinist, Bridgeport.

* W. H. Moore, AA captain, Fort Worth.

* J. B. Boyd, AA ass't supt., flight, Chicago.

* G. V. Zoller, AA operations mgr., Wilmington.

* H. W. Susott, AA captain, Tulsa.

* C. C. Wehrung, AA captain, Fort Worth.

* G. F. Davis, AA flight dispatch mgr., Nashville.

* * * David Rittenhouse, Grumman, v.p.-production, Bethpage, N. Y. 37 years.

* E. F. Burton, Douglas, chief engineer, Santa Monica. 30 years.

* George F. Titterton, Grumman, v.p.-contracts, Bethpage, N. Y.

* Robert L. Hall, Grumman, v.p.-engineering, Bethpage, N. Y.

* William J. Hoffman, Grumman, v.p.-manufacturing engineering, Bethpage, N. Y.



UNDER ONE ROOF

By James J. Haggerty, Jr.
(No. 8 in a series)



"GAP-6 workers completed 92½-ton jet bombers ahead of schedule while tooling to make 50,000 airplane parts"

Says James J. Haggerty, Jr., Aviation Staff Writer, Collier's

Here is a job well done—emphasizing the efficiency of completely-integrated aircraft production *under one roof*.

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Already a vital part of America's defense industry, GAP-6 in Georgia can easily produce still more and still bigger aircraft.

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Georgia
Division, Marietta

Pioneer and Continental: CAB Approves First Trunk-Local Service Merger

IN A DECISION marked by sharp policy differences, CAB has approved absorption of Pioneer Air Lines by Continental Air Lines. The deal, which is the first instance of a merger between a trunk and a local service carrier, will be consummated as soon as various labor conditions attached to CAB approval can be met.

Chairman Chan Gurney, vice chairman Harmar D. Denny, and member Oswald Ryan formed the majority favoring the merger. Members Josh Lee and Joseph P. Adams dissented, claiming the majority deserted the "long-established policy" of keeping trunks and feeders separate.

Continental and Pioneer entered their agreement on Dec. 10, 1953. It calls for Continental to pay about \$1 million for Pioneer's assets and to give Pioneer 65,000 shares of Continental stock valued at \$390,000. In exchange, Continental will get Pioneer's local service routes in Texas, including first-time access to the Dallas-Fort Worth market.

Pioneer's temporary local service certificate expired in September, but continues in force pending board action on a renewal application. If the merger is consummated as now appears certain, Continental will assume the responsibility of processing the renewal bid through CAB proceedings.

The CAB majority found the agreement to be "consistent with the public interest." Largely, their approval decision rested on economic findings of examiner Thomas L. Wrenn. Most of their written opinion, therefore, dealt

with following policy arguments raised in the Lee and Adams dissents.

• **Departing from policy:** The majority termed its action "an exception to, not an abandonment of, the board's policy . . ."

Member Lee accused the majority, however, of "breaking faith with all of the trunk carriers who have relied upon the many assurances of the board that the trunks and feeders would be kept separate."

Member Adams not only could not "condone" the policy departure, but saw the majority's action as setting a bad precedent whereby trunks could get access to previously inaccessible markets by simply buying up a feeder.

• **Offset issue:** Involved is the \$390,000 profit which would accrue to Pioneer in the form of Continental stock. Under the Supreme Court decision in the Western Air Lines Case this year, such profits were held to be "other revenue" and subject to offset against subsidy.

Question in this case is whether CAB can and should offset the profits which Pioneer will get under an agreement entered while it was an "air carrier" but will not physically receive until after it ceases to be an air carrier.

The CAB majority expressed "serious doubt of the local propriety of such an offset" and accordingly refused to reopen Pioneer's mail rate case to consider it. Member Lee held the rate should have been opened the day of the merger decision and the profits offset against Pioneer's subsidy needs until final consummation of the merger.

The majority said it would be "false economy from the government's standpoint to attempt to achieve the additional gain of such an offset at the probable cost of foregoing cumulative, continuing savings which will exceed the value of the offset within a relatively brief period." It was estimated the merger would result in minimum subsidy savings of \$221,000 annually if accomplished.

The majority held that to take offset action "would seriously jeopardize the consummation of the acquisition."

Lee held, though, that the board not only should take the offset action, but is required to by the Supreme Court decision. It is a "statutory responsibility," he said. "By the very action by which Pioneer limits operations as an air carrier, it will of necessity realize the profits in question. It is all part of the same transaction, a transaction which requires approval by the board."

As far as jeopardizing the merger, Lee said, "the fact that Pioneer would or would not refuse to complete the transaction does not excuse the majority from fulfilling its statutory obligations to protect the treasury of the United States."

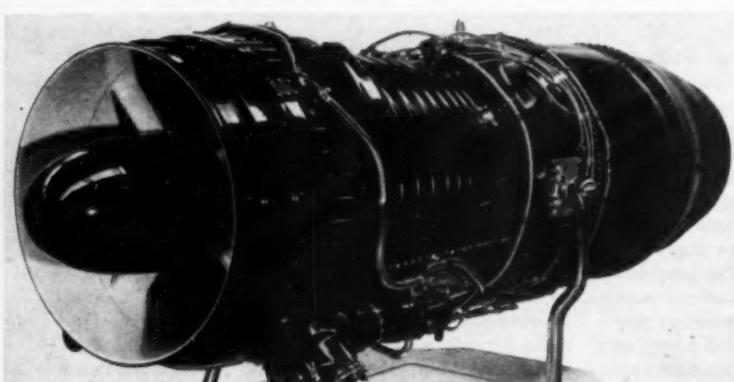
• **DC-3 rentals:** This issue goes back to Pioneer's ill-fated operation with Martin 2-0-2 aircraft. The Martins, according to CAB, were substituted for DC-3's which "had been fully depreciated at public expense by the allowance of depreciation thereon as an element in Pioneer's subsidy mail pay."

When Pioneer switched back to DC-3's, after CAB refused to underwrite the Martin operation, CAB would not allow the DC-3 rentals as an expense to Pioneer "on the ground that, but for the Martin interlude, the carrier would have been operating DC-3's without cost either for depreciation or rental."

Thus the question in the merger case is whether Continental, in taking over Pioneer's DC-3 leases, is entitled to a mail pay allowance for such rentals.

The CAB majority refused to rule on the question in its merger decision, stating that "Continental is hereby placed on notice that this issue will remain to be resolved in its future mail rate proceedings."

Meanwhile, aside from these arguments, the Continental-Pioneer agreement provides that an evaluation date for determining actual assets of Pioneer will be the last date of the month in which CAB makes its decision. Thus, December 31, 1954, will be the evaluation date. The agreement further provides that a closing date for the transaction will be 90 days from the evaluation date or, as it turns out, April 1. Both companies already have won stockholder approval of the merger. • • •



ARMSTRONG-SIDDELEY SAPPHIRE 7 has passed 150-hour type-test at 10,200 lbs. static thrust, rating it highest British single-compressor jet engine without extensive bleeding and variable-inlet guide vanes. Data: net dry weight, 2792 lbs.; diameter, over trunnions, 37.4 in.; length, 127.6 in.; frontal area, 7.4 sq. ft.; specific consumption, full sea level thrust, 0.885 lb./hr./lb. thrust.



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...When its versatility permits a wide range of functions.
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...And finally when it's out of engineering and in the air—when it's being delivered and in operation.

The Martin B-57—brilliant new member of the Air Force's family—is in truth a great airplane. Low wing loading gives it take off and high altitude performance characteristics exceptional in the reconnaissance bomber class, and the Martin rotary bomb door makes it capable of both high and low-level bombing runs at fighter speed.

Basic configuration changes now make possible adaptions of the USAF B-57 to cover a wide variety of critical missions.

But for the final word on this remarkably versatile airplane—ask the man who has flown one.

You will hear more about Martin!

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Airline Commentary

By Eric Bramley

THREE ARE MANY stories about airlines silverware, blankets, etc., going astray and turning up in faraway places. However, this one may set a record. Frank Howe, Capital Airlines' assistant superintendent of stations and flight service, recently wrote the following letter to Guinea Airways, a small domestic airline in Australia: "The airline business, as we all know, is somewhat fantastic. So, upon finding one of your six-quart thermos jug covers on our system, we were not surprised, but rather delighted that we could return it to you." At the same time, Howe also returned one Philippine Air Lines spoon.



* * *

WHAT ABOUT using closed-circuit television for airlines' annual sales conferences? The possibility's been discussed; sales managers would either view proceedings in their home cities or might gather in regional sessions. Our vote is against TV. Even though a full-blown sales meeting is an expensive item, TV would be even more costly. Most meetings last a couple of days and we doubt if the material to be covered could be boiled down sufficiently for a short TV presentation. Also, some of the best ideas at sales conferences are exchanged in the smoke-filled rooms after the close of the business day. TV has been used very effectively by Pan American to get across messages and plans to travel agents (as many as 2500 at a time), but a sales meeting is something else again.

* * *

IT'S NICE to be able to report, for a change, good news about baggage handling. A United Air Lines' survey in five cities showed DC-7 passengers claiming bags 6.08 minutes after flight arrival. Times ranged from 3.8 minutes at Hartford to 8.16 at Washington. During the survey, an average of 49 bags was handled per flight.

* * *

THIS MAGAZINE has again won two awards in TWA's annual aviation writing and picture competition. Bill Henzey, transport editor, won in the business-financial class, and we were first in the sales and promotion category. Our thanks to our friends in the industry who made the award possible by giving us their time and advice on column items and stories.

Sales, Traffic, Promotion

Northeast Airlines has filed with CAB for a 10% across-the-board fare increase, effective Jan. 1. Result will be that on some routes NEA's fare will be higher than competing lines (New York-Boston, \$13.40, compared with \$12.15 for American and Eastern). Last carrier to increase fares was Colonial up 5% on Aug. 1. Still pending is a Delta-C&S proposal to round-off all fares to the next highest dollar . . . NEA, in a move to improve passenger service, has set up four committees to look into baggage mishandlings, on-time operation, passenger record irregularities, and flight information being sent to the field . . .

Central Airlines on Dec. 7 started service on its route from Little Rock to Kansas City via Hot Springs, Ft. Smith, Fayetteville and Joplin . . . **Los Angeles-Miami** aircoach interchange service was started Nov. 29 by American, Delta-C&S and National. Stops are made at Dallas, New Orleans and Tampa . . .

Recent Frontier Airlines' passenger survey covering 6984 customers showed: 4736 traveling on business, 861 on vacation, remainder miscellaneous. There were 1927 first-riders. Of the total, 5227 were men, 1757 women. Oil industry contributed largest group of passengers with 799; salesmen were a close second with 728. Great majority of people live within 15 miles of the airport; "other people" influenced them more than anything else in taking their first trip on Frontier . . .

A "fly now, pay later" plan, featuring no down payment and bank interest rates, was started Dec. 1 by Delta-C&S Air Lines. Under the plan, financed by local banks, tickets to anywhere in the world can be obtained within 24 hours

of the application without endorsers or cosigners, the company said . . . **Air France** has set up a "Traveloan" plan, presently available only in the five boroughs of New York. Plan, developed in conjunction with Chemical Corn Exchange Bank, will later be extended to other areas of U. S. and to Canada. Interest rate is between 6% and 7% with terms for 12 to 24 months. Life insurance is included, covering unpaid balance up to \$5,000 at no extra cost . . .

Equipment notes: **United Air Lines** puts DC-7's on all first-class flights to Hawaii on Dec. 31 . . . **Colonial Airlines** on Dec. 1 substituted DC-3's for DC-4's on its daily Washington-Syracuse-Ottawa-Montreal-New York flight . . . **American Airlines** on Jan. 2 replaces Convairs with DC-6's on its two daily New York-Toronto non-stops. Convairs remain on trips stopping at Buffalo.

Product notes: **5-Way Coffee** Producing, River Forest, Ill., is now producing an airline kit of 48 units. A unit consists of 6-oz. cup, napkins, 6-in. round tray, disposable stirrer, serving of instant coffee, Pream, sugar. Mohawk is first airline customer . . . **Tel-O-Tronics Inc.**, San Antonio, Tex., has now installed hotel reservations boards at San Antonio and Wichita airports. Board shows space available at hotels in a city; traveler then obtains reservation by telephone . . .

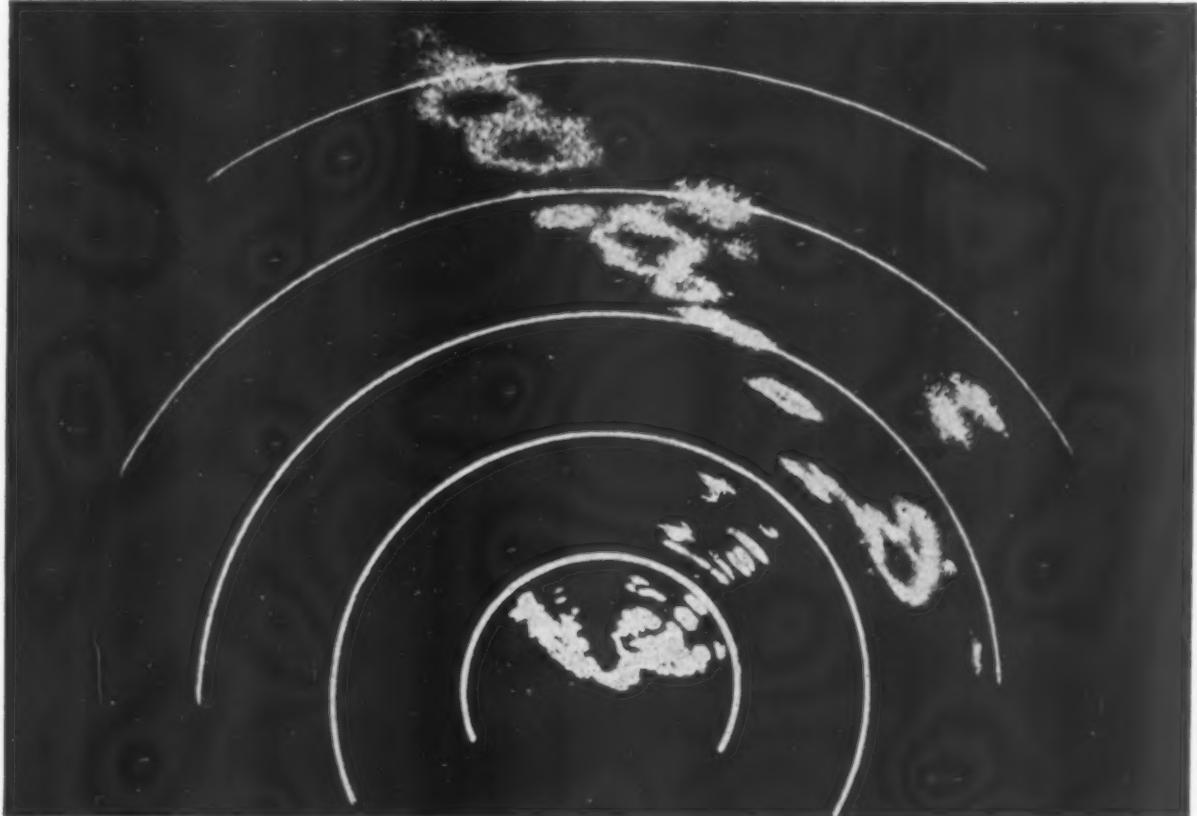
American Airlines on Nov. 29 celebrated first anniversary of DC-7 trans-continental non-stop service. AA says that during the year its New York-Los Angeles business jumped 73% compared with a 13% increase for the industry on all routes (the 73% includes all traffic between the points—DC-6, DC-7, non-stops and flights making stops).



STRETCHER PASSENGERS can now be accommodated on TWA first-class Constellations. Kits, containing support frame, stretcher, mattress, curtain rod and curtain, two seat-belt extensions and two cargo tie-down belts, are available at five TWA cities. Charge amounts to four full-fare one-way tickets which covers transportation of stretcher passenger and one or two attendants (one is required).

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International Aviation

By Anthony Vandyk

ACCORDING to Swedish Air Force statements, the strongest air powers in the world today are the Soviet Union, the United States, the United Kingdom, and Red China in that order. Next comes Sweden which has 1200



combat aircraft and is planning a 22% expansion of this strength. It is questionable, however, whether Sweden will be able to hold its fifth place even with this expansion.

Latest word from behind the Iron Curtain is that Poland is fast expanding the combat strength of its air force. Another air arm that is rapidly gaining strength is France's, which is reportedly aiming at 1000 combat plane strength by the end of 1955. Fastest expansion of all is that taking place in Japan, while the West German program, once it gets under way, will be even faster. Both the Japanese and German air arms will have well over 1000 combat planes each within a very few years.

Although it is only of medium size, the Swedish Air Force is one of the most efficient in the world. According to European reports Sweden's air arm has only 23 persons for each combat plane, while the RAF has 153 and the USAF 133. The French Air Force has 103, while the West German air arm will probably have about 60.

These comparisons do not take into account the make-up of the various air forces, and the fact that an air arm with offensive as well as defensive aircraft will have more men per plane than one with purely defensive aircraft. It is, incidentally, a sobering thought that only four of the nations outside the communist bloc have air forces currently equipped with modern bombers: the U.S., the U.K., Australia, and, strangely enough, Venezuela. Prior to World War II almost every air force in the world had the means to hit back effectively as well as to defend itself.

It is in naval aviation, however, that the foreign nations lag most behind the U. S. Only the U. K., France, the Netherlands, Australia, and Canada maintain aircraft carriers and in all cases high-performance turbine aircraft are conspicuous by their absence in combat units. The sole consolation is that all reports indicate that Soviet naval aviation is at least equally bad.



UAT-AEROMARITIME, French independent, has bought two Nord 2501's for use in Central Africa. It has an option on four more of the Bristol Hercules-powered transports. All Nord 2501's produced heretofore have been for the French Air Force.

A. V. Roe in Major Reorganization

A. V. Roe Canada has undertaken a major reorganization of corporate structure. Two new companies have been formed and a third purchased to make a three-company group with A. V. Roe Canada as the parent company. This new Canadian group is, in turn, directly owned by Britain's Hawker Siddeley Group.

The three subsidiary companies of A. V. Roe Canada are: Avro Aircraft, formed out of the aircraft division; Orenda Engines, formed out of the gas turbine division; and Canadian Steel Improvement, producer of light alloy and titanium precision forgings and castings, purchased from the Hawker Siddeley Group for cash.

Most important of the companies, which have a combined backlog of some \$650 million, is Avro Aircraft, currently building 530 CF-100 Mark IV all-weather fighters for the RCAF (over 300 have been completed) and is working on an RCAF prototype development order for the CF-105. Latter is a delta-wing interceptor with a top speed of some 1250 mph, a range of over 1500 miles, and a gross weight of about 55,000 lbs. The first CF-105 free-flight scale model is expected to fly early in 1955, but production aircraft will not be available before 1959 or 1960.

The prototype CF-105 will have two P&W J57's, but production planes are scheduled to use the 20,000-lb.-thrust P.S. 13, developed by Orenda Engines. This is a twin-spool unit featuring extensive use of titanium.

Manufacturing Briefs

Three Japanese aircraft firms have submitted jet trainer projects to the National Defense Agency for sponsorship. **Shin Mitsubishi's** design is designated JTM-1. It would be equipped with a Turbomeca Marboré or a Japan Jet Engine JO-1 turbojet. One of its features is a considerably swept-back wing.

Fuji has submitted two designs: the FJT-51 with swept wing and powered by a 4500-lb.-thrust jet, and the FJT-21, a 250-mph class trainer somewhat re-

sembling the Beechcraft Mentor with a low-power engine (Marboré, JO-1 or Fairchild J44). . . . The **Shin Meiwa** company's design is designated KJT-01 and would be powered by a 4500-lb.-thrust jet. No other details are available.

SNCA du Sud-Est is likely to fly its Durandal supersonic fighter early in 1955. Another of the French company's designs, the Alouette II helicopter, powered by an Artouste II turbine, is due to fly in the early spring. . . . **SNCA du Sud-Ouest** is to build a pre-production batch of 10 Djinji helicopters for the French ground forces. . . . Britain's Folland Midge (1640-lb.-thrust Viper jet) has dived supersonically.

Military Briefs

The **RAF** will form its first Vickers Valiant jet bomber squadron in March. . . . **Ethiopia** is planning to acquire some jet fighters, probably Swedish Saab-29's. . . . The **Netherlands** is to get 35 helicopters under MDAP for use by the air force and army. All will be flown and maintained by the air force. . . . The **French Air Force** now has three operation squadrons of SNCASE Misstrals (improved Vampires). . . . The **Nicaraguan Air Force** has acquired 25 surplus North American F-51 fighters from the Swedish Air Force, reportedly in barter for cotton.

Transport Briefs

KLM next summer will operate three Amsterdam-New York flights daily—two tourist and one first-class. . . . **Japan Air Lines** will start a twice-weekly service between Tokyo-Okinawa-Hong Kong on February 4. . . . **Silver City Airways** plans to start car-ferry operations between Northwest England and Northern Ireland and between Southwest Scotland and Northern Ireland. . . . **Italy's Alitalia** is obtaining two more Convair 340's. . . . **Germany's Lufthansa** has taken delivery in Hamburg of two of its four Convair 340's. . . . **Nieuw Guinea Luchtvaart** has started operations in Dutch New Guinea with two de Havilland-Canada Beavers.

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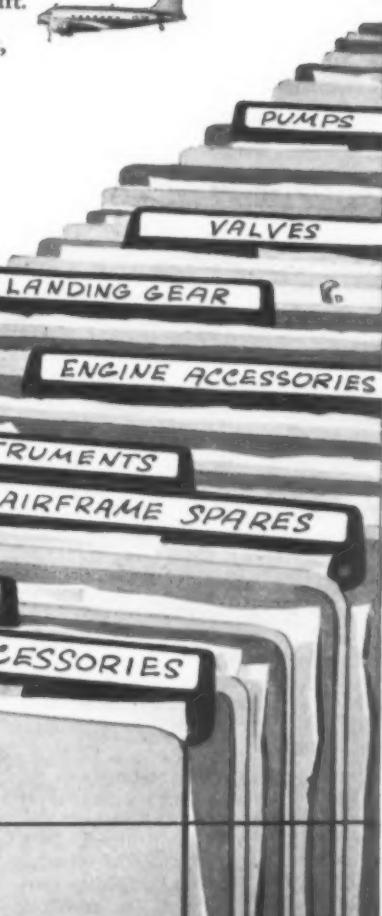
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EN ROUTE . . .

WAYNE W. PARRISH

Here's one launching I missed

WHAT WERE ALL you folks doing in the year 1660? I know I was around somewhere, the way my bones are creaking these days, but my memory's slipped and for the life of me I can't remember 1660. But it was quite a year, especially in Brussels, Belgium. Seems that they had a restaurant opening over there and while I can't imagine missing any inaugurations, dedications, openings, and launchings, I must have passed this one by.

It was quite a building. Large flat Spanish bricks, oaken beams, and the front was in Italo-Flemish style with skewbacked gables. It was on a narrow street just off the old town hall square.

As you may have already suspected, the point about this old restaurant is that it's still going strong. Sometime in the 19th Century the management began calling it "L'Epaule de Mouton," which in perfectly simple English means "Shoulder of Lamb." The present owner is Monsieur Chantraine and he and his tiny restaurant—just seven tables—are famed all over Europe.

AAP's Bill Stackpole and I were taken there in September by Bob Maillard and Julius Baus of Sabena. Unfortunately for me, I was off my feed as a result of two preceding weeks in London and Paris and being surfeited with rich foods and wines and whatnot. I didn't care if I ate for a week, but that didn't go for Bill Stackpole who maintains in perfect order an iron stomach and rigid constitution.

Proud of Souffle Ike

M. Chantraine has dreamed up no less than 83 exclusive culinary creations. Everything's prepared to order. He's quite proud of his Souffle Ike, in honor of President Eisenhower. Bill Stackpole says the lobster creation he ordered was the finest single dish he's ever tasted. I got by with a steak which would have been fine if I'd been hungry. Next time I'm going to work up a real appetite, because M. Chantraine's tiny eating place is worth recommending most highly.

And while I'm on restaurants, let me tip you off on a very good one in Paris. Not cheap, but not the most expensive either. It's La Bourride, at 5 Rue Paul-Cezanne. Excellent food with lots of variety, and the bartender turns out a martini worthy of the name. A flock of canaries flies overhead on oc-

casions but they seem to be very well house broken.

On another subject, I'm a guy with a lot of idiosyncrasies, which is merely a big word meaning that I'm nuts. Stated in more gentle terms, I like to indulge myself from time to time in illusions of grandeur. And one of the things I like to do, at least for a limited time, is to hire a big car and chauffeur in London. So when Bill Stackpole decided to go with me to the Farnborough show in London last September I wrote to the car firm of Godfrey Davis, Ltd., and ordered the biggest danged Rolls Royce they had in town plus a liveried chauffeur, to meet us when we got off the BOAC Stratocruiser at London.

Stick my nose in the air

You have no idea how it raises one's morale to pretend that you're sales manager for an aircraft company and step out of an airplane into a Rolls Royce and drive in style to your hotel. Real high class. Nothing but the best. Only the government and aircraft salesmen can afford these things except for those brief moments when I throw caution to the wind and let the peasants stare in the windows to see what manner of royalty is snubbing them. I can stick my nose in the air, too.

So sure enough, as soon as we cleared customs, our man Hunt was there to take us to our car and it was a very fine buggy. Shined up, hood a half-mile long, lap robe for cool days, etc. For about four days we drove around London like government officials and as for the bill—well morale-building is so important in these days of stress and strain. (*That's what the Army says, yes it does.*)

Having acquired a king-size Rolls, we couldn't afford to stay at some dump of a hotel, so we put up at Claridge's so our Rolls would be lined up on the outside with cars of princelets and big shots from around the world. I once stayed at Claridge's and about froze to death, but this time we had a real nice layout. In my huge bathroom was a very fine bidet (*a squirt job, no less*); which shows that Claridge's is much more civilized than the rest of England and the U. S.

As I say, I have my fling at illusions of grandeur, and then go to extremes. Two weeks later Bill and I returned to London for a few days before coming back home and we stayed at the Amer-

ican Club on Piccadilly and used the subway and taxicabs, and, believe it or not, our rooms were on the fifth floor and there was no elevator. I thought every time I reached that fifth floor it would be my absolute last. They called it the fourth floor, because they don't count the ground floor as first in Europe, but I can testify to five flights of steps.

We went over and back on BOAC Stratocruisers and I must say that the service and everything was up to the usual high British standards. In fact I want to pay a special tribute to two of the cabin crew members on the return flight; they were among the very best I've ever seen anywhere. One was Stewardess N. O'Neill, who always had a genuine smile on her face, and the other was Bar Steward A. R. Williams who worked furiously to meet all the drink demands and kept his patience and smiles all the way through. I've never seen a bartender work harder.

On the return trip we stopped at Shannon and then were to stop at Gander. But Gander was closed in and we came on to Sydney, Nova Scotia, one of the trans-Atlantic alternates. This was the first time in all of the 42 Atlantic flights I've made that I hit this airport.

How to meet your wife

I might add to this yarn that my wife is also quite a traveler. At the last minute she got an assignment to do some work in Paris for two weeks and during one of those weeks I was in the same city. So she arrived in Paris on TWA and we were together for a week. Then Bill Stackpole and I flew to Amsterdam, Brussels, and London to return on BOAC on a Saturday night. As of my departure from Paris on the previous Monday, my wife was to leave Paris on that same Saturday night on TWA. We didn't communicate with each other during the week.

So while I was on the BOAC Stratocruiser from London to Shannon to Nova Scotia to New York, my wife was on a TWA Constellation from Paris to Iceland to New York. She arrived 45 minutes ahead of me and was waiting in the Idlewild customs hall when I came through, and we joined forces and baggage to return to Washington together. Kinda crazy life, I guess, but never a dull moment. • • •



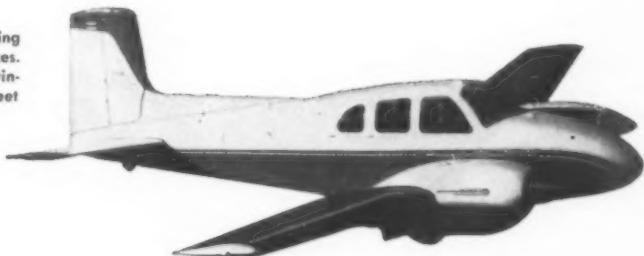
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37	38	39	40	41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56	57	58	59	60
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1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24
25	26	27	28	29	30	31	32	33	34	35	36
37	38	39	40	41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72
73	74	75	76	77	78	79	80	81	82	83	84
85	86	87	88	89	90	91	92	93	94	95	96
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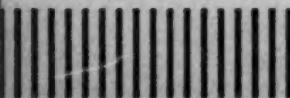
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ADVERTISERS IN THIS ISSUE

Aeroquip Corp.	29
Aircraft Radio Corp.	19
Beech Aircraft Corp.	63
Bendix Aviation Corp.	
Bendix Radio Div.	59
Bendix Products Div.	47, 67
Eclipse Pioneer Div.	9
Scintilla Div.	42
Boeing Airplane Co.	16
Braniff Airways, Inc.	49
Bulletin Board (Classified)	64
Canadair Ltd.	61
Chandler-Evans, Division Niles-Bement-Pond Co.	39
Convair, a Division of General Dynamics Corp.	2
Curtiss-Wright Corp.	18
Fairchild Engine & Airplane Corp.	
Fairchild Aircraft Div.	50
Flightex Fabrics, Inc.	46
General Electric Co.	13
Gilligan Bros., Inc.	7
B. F. Goodrich Co., The	20
Goodyear Tire & Rubber Co., Inc.	5
Hi-Shear Rivet Tool Co., The	45
Lockheed Aircraft Corp.	55
Glenn L. Martin Co., The	57
North American Aviation, Inc.	53
Pan American World Airways, Inc.	14, 15
Pratt & Whitney Aircraft, Div. of United Aircraft Corp.	34, 35
Rehr Aircraft Corp.	11
Sargent Engineering Corp.	27
Simmonds Aeroaccessories, Inc.	8
Southwest Airmotive Co.	12
Summers Gyroscope Co.	50
Teco, Inc. (Transport Equipment Co.)	6
Temco Aircraft Corp.	10
Texas Co., The	68
Tubing Seal-Cap, Inc.	45
Vickers, Inc.	31

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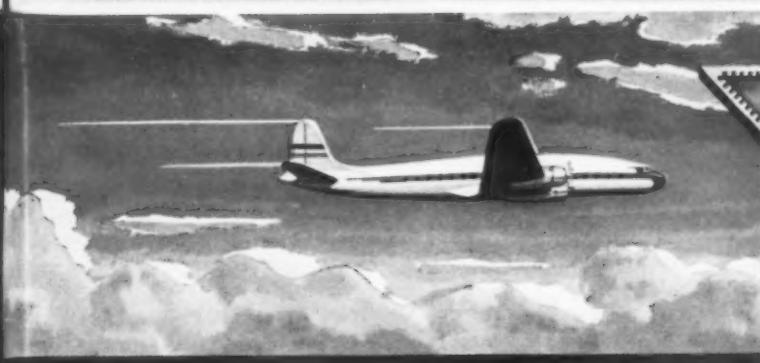
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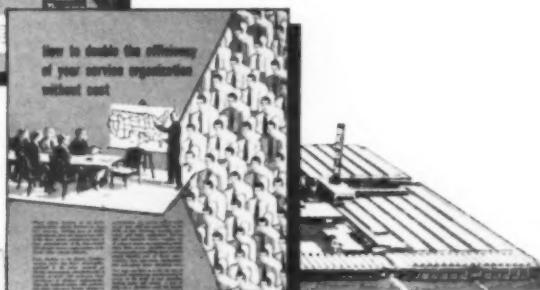
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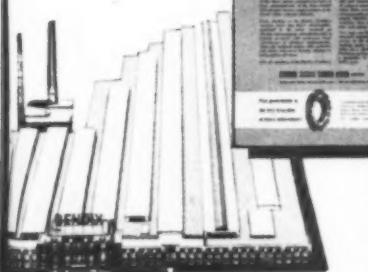
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